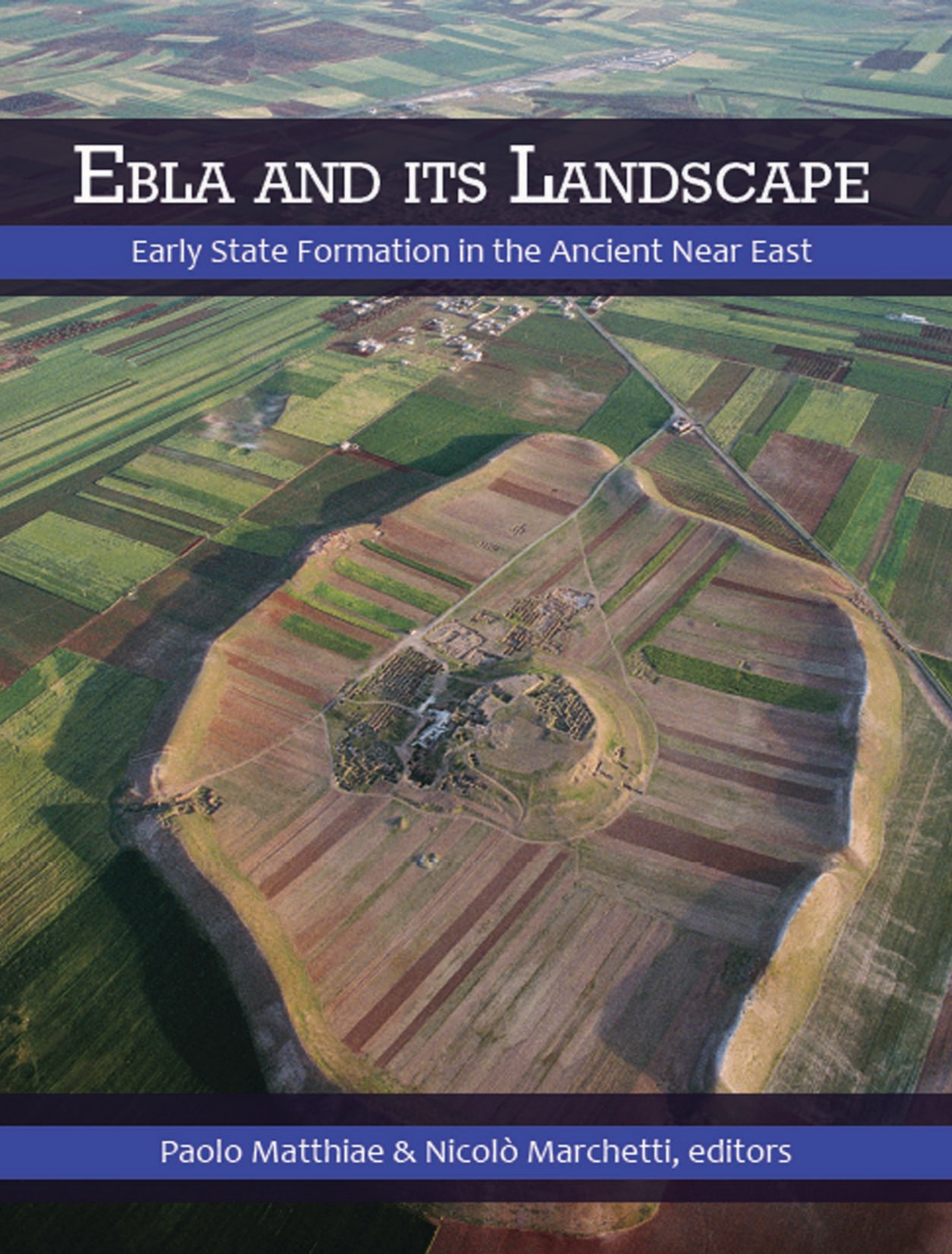


An aerial photograph of a rural landscape. The foreground and middle ground are dominated by a large, irregularly shaped field with a complex pattern of brown, tan, and green patches, suggesting different crops or soil types. In the center of this field is a small, fortified site with several buildings and walls. A road or path runs diagonally across the field, passing near the fortified site. The background shows a more uniform green landscape, possibly a forest or a different type of agricultural land.

EBLA AND ITS LANDSCAPE

Early State Formation in the Ancient Near East

Paolo Matthiae & Nicolò Marchetti, editors

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Early State Formation in the Ancient Near East

Edited by
Paolo Matthiae and Nicolò Marchetti

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INTRODUCTION

REPRESENTING THE *CHORA* OF EBLA

P. Matthiae and N. Marchetti

The excavations at Ebla, ongoing since 1964, are representative of the development of research agendas in modern times, although the nature of some exceptional finds also makes them unique. In almost fifty years, several approaches and methods have been tested, tuned, and abandoned in favor of more sophisticated approaches, each time gaining a differentiated, deeper understanding of the site and its region. The cooperation among several colleagues from widely different fields of expertise has drawn together an impressive array of data, which were still being analyzed during the last two, tragic years for Syria—the last fieldwork at the site and its region having been in the fall of 2010.

The Italian Expedition by Sapienza University of Rome has carried out systematic excavations at the site of Tell Mardikh/Ebla between 1964 and 2010 (Plate 1:1), often with two yearly campaigns in spring and fall during the last fifteen years (see Matthiae, in this volume [Chapter 1](#), for an account of the excavation strategy at the site), but it has also been involved in the exploration of other major sites that have subsequently become independent research projects. The early 1970s, besides some salvage excavations at Tell Fray, in the Lake Assad area, jointly with the DGAM in 1973, saw the beginning of extensive soundings at Tell Afis (in 1970, 1972, and 1978; in 1986 the site came to be explored by the University of Pisa and then of Florence) and at Tell Tuqan (in 1978, 1981, 1986, and 1993; investigations by the University of Lecce started in 2006). The 1980s saw the systematic

start of bioarchaeological sampling, as well as the beginning of archaeometric and radiometric analyses and geomorphological researches. The discovery in 1975 of the Royal Archives ignited a flow of new studies, which eventually resulted in the establishment of a new academic discipline, Eblaitology.

The Expedition's engagement with the landscape of Ebla resulted not only in excavations, but also in several surveys. During its very first year of activity, in 1964, the Expedition carried out a systematic surface survey of visible sites around Tell Mardikh, both of mound types (Liverani 1965) and of the remains of the Classical and Post-Classical ages (Pericoli Ridolfini 1965). These researches were complemented by those in the eastern steppe in the early 1970s (de Maigret 1974). In the 1980s, trips with unsystematic collection of surface materials were carried out at individual sites in the region, whereas the area to the northwest of Ebla was subsequently investigated by the mission at Tell Afis (see Mantellini, Micale, and Peyronel, in this volume, on the history of surveys in the Ebla Chora Project [ECP] region). When after 2005 landscape researches gained momentum again, it was the area to the east of Ebla that mostly attracted our attention, since the decisive growth of mid-third millennium B.C. urbanization in the Levant had been marked by the inclusion/settlement of peripheral, steppic areas into the organization of those early states.

The history of topographical mapping at Ebla and in the ECP region highlights the shifting

political and research frameworks that succeeded one another in the area. During the French mandate period, the Services Géographiques de l'Armée du Levant prepared some 1:50,000 maps of Syria, and the Saraqeb region was one of the last to be completed in 1943 (Figure 0.1), with the establishment of geodetic points at the top of mounds (the one at Ebla is still existing, having an absolute elevation of 431 m a.s.l.). However, mapping did not extend farther east than the middle of the ECP area, since the steppe evidently was not considered strategic for the exploitation and control of the region. When the Italian Expedition started in 1964, only sketches were carried out, both of the surveyed area (Matthiae 1965, figs. 7–8) and the tell itself (Matthiae 1965, fig. 2, a sketch by architect Alberto Davico). A few years later, new issues emerged throughout rapidly developing Syria. Although the Expedition did not get a copy of them at that time, in 1967 the Syrian Air Force completed a systematic aerial survey of the Ebla region at 1:18,000 scale (Figure 0.2), which served as the basis for the new series of topographical maps of the country at 1:50,000 scale. In this connection, it is significant that a topographical team from Aleppo (Khoury-Palouliau) hired by the Expedition produced in 1968 the basis out of which architects Carlo Cataldi Tassoni, Fabio Piraino, and Luigi Presen drew the new 1 m-contour interval map of Tell Mardikh (Figure 0.5). Later on, the landscape around Ebla was documented at a 1:200,000 and 1:100,000 scale in the maps made by the former Soviet Union, a long-standing strategic partner of Syria, which were published in the 1970s and 1980s (the sheet of Saraqeb with Ebla is dated to 1984) (Plate 1:2). In the years 2000 and 2001, a new topographical survey was carried out at the site by Riccardo Franceschetti and Emiliano Barletta, with a 0.5 m-contour interval (cf. the basis for Figures 0.6 and 1.2).

The impact on contemporary research of remote sensing images released in the last decades has been covered by many publications and will not be repeated here (see Galiatsatos and Mantellini, in this volume). The many satellite photographs acquired between 1959 and 1972 during the

US secret CORONA missions (Figure 0.3), which were declassified in 1995, document an environment that has significantly changed since then. The ground resolution ranges from the 12.20 m of the early KH-1 camera to the 1.80–7.60 m of the last KH-B camera. Among recent significant materials used in our research, a stereo pair of Cartosat-1 with a resolution of 2.5 m was acquired in 2009 (Figure 0.4). Anthropogenic traces in the landscape can be variously detected in other recent high-resolution imagery (see Bitelli, Mandanici, and Vittuari, in this volume), such as the Spot, GeoEye, and WorldView-2 series (Plates 2:1–2, 3:1). The latter imagery is especially interesting because it has a resolution of 0.5 m in the panchromatic and 1.84 m in the eight multispectral bands (Plate 2:2), allowing for different kinds of investigations on surface features. The pattern of radial hollow ways so well observed around mounds in Upper Mesopotamia (Ur 2002, 80–84; 2003; 2010, 76–87, 133–46; Ur, Karsgaard, and Oates 2011, 11; Wilkinson 1993a; 1993b, 66, 111–16) is much less clear at Ebla, probably also due to a more intense land use and different soil features. The global digital elevation model GDEM, based on ASTER data, is used for preliminary, gross evaluation of the elevation, hydrography, and some other environmental features in relations to the settlement pattern (Plate 3:2). The huge extension of the ECP area of investigation (3,600 km²) makes the acquisition of the new generation of elevation models too expensive.

It is starting from these representations of a site and its catchment that we conceived the Ebla Chora Project (ECP). An approach combining different disciplines and research strategies was therefore employed in order to refine our views on how urban life affected landscape organization and exploitation. The *chora* of Ebla (i.e. the core region sustaining the urban center, the nuclear area, and the economic hinterland, independently of any greater political aggregation) has been defined by selecting different ecological variables (marl plateau and basalt outcrops, hilly steppe and flat humid areas), with a predominantly west-east transect (90 km, with a north-south extension of 40 km), which also includes the

steppe to the south-east of Tell Mardikh (cf. Plate 13:1). Surveys carried out by other teams (the Tell Afis-Jazr one and the Aleppo one by the German Topoi group) halted approximately around the area of investigation designed by the ECP.

A quite unique documentation singling out Ebla from other archaeological sites is represented by the Royal Archives of Ebla, found in Royal Palace G and dating from the Early Bronze (EB) IVA, the so-called mature or classic Early Syrian phase. The archives consisted of circa three thousand cuneiform tablets, mostly of administrative character, but not only. In the archives were also found letters sent from foreign rulers or high-ranking officials to the king of Ebla, the correspondence of officials of the Eblaite kingdom, and detailed accounts of ritual activities that were performed at Ebla and in other centers of the territory controlled by it, in addition to a noteworthy corpus of lexical and literary texts. Most of the administrative documents are records of deliveries of textiles, precious metals, and metal artifacts. However, a significant number of texts dealing with deliveries of livestock and agricultural products (mostly cereal crops, but also olives and olive oil, vine and wine, other kinds of fruit, and vegetables) from the villages to the central administration also exist, which bear information on the economic activities and organization of rural areas.

The problem of the rise and the structuring of an early state, a central issue in contemporary archaeological thought, can be tackled by expanding the level of analysis to the landscape around Ebla and taking into account the information on the economic and social fabric of the Ebla state contained in the tablets. The possibility of investigating archaeologically such a thin time slice as EB IVA is a real one, thanks to the considerable progresses made during the past decade in seriating material culture assemblages, interpreting the rich evidence of ancient visual communications, and exposing the urban structure. The study of the administrative texts and of the royal palace, with its different sectors devoted to official and economic activities, and the excavation in the lower town of a productive

complex, two massive temples, and other buildings now give us a detailed picture of the economic organization of this capital town (Figure 0.6). Archaeological surface surveys, remote sensing, and geomorphological, bioarchaeological, and archaeometric studies concur in building a multi-tier explanatory pattern on the functioning of the early state of Ebla.

ACKNOWLEDGMENTS

This perspective has been recognized by the European Research Council and its anonymous referees as extremely promising for giving new results on such a significant theme. Accordingly, within the ERC Advanced Grant 2009 call, the project has been invited to negotiation and finally funded, in March 2010, with the signature of the Grant Agreement no. 249394. The project officially started on the 1st of April 2010. Paolo Matthiae of Sapienza University of Rome is the Principal Investigator of the Ebla Chora Project, and Nicolò Marchetti of the Alma Mater Studiorum-University of Bologna is a Beneficiary responsible for landscape studies. All the colleagues contributing to this volume deserve credit and gratitude for their efforts and passion for research: we all benefited from mutual crosschecking and discussions during all stages of our project, of which we present here a sort of mid-term report. We are especially grateful to some colleagues at our two universities. The rectors of the University of Rome and Bologna, respectively Prof. Luigi Frati and Prof. Ivano Dionigi, have supported with enthusiasm our project since its inception. The directors of our departments likewise helped us in every possible way: Gilda Bartoloni and now Enzo Lippolis in Rome (Department of Sciences of Antiquity), and Maurizio Tosi and now Giuseppe Sassatelli in Bologna (Department of Archaeology, now of History and Cultures). The administrative staff has done an outstanding job in managing such a complex project. The chief financial officers of our departments (Bruna Fermani and now Angela Chiaranza in Rome, Maria Concetta Chiaravalloti and now Pasquale Frattaruolo in Bologna) offered together with their staff a full-fledged cooperation; the ARIC team at the

University of Bologna (foremost among them Verdiana Bandini and Paola Motetti, with Marco Degani and Mara Caputo also being very helpful in the beginning) has managed the project finances. We have always received a professional treatment and great support from the officers at the European Research Council Executive Agency in Brussels, especially from Kalina Lewanska and Sandra Petrilli.

The present volume would not have seen the light without the intelligent and careful efforts of an editorial team made by several colleagues and pupils, coordinated by Frances Pinnock, to whom we are indebted in too many ways to be detailed here. To Sara Pizzimenti and Agnese Vacca we owe the layout and the composition of the volume; Maria Forza drew anew several topographical maps of Ebla; Marta D'Andrea, Maria Gabriella Micale, and Davide Nadali took care of proofreading and indexing the volume, as well as crosschecking the references in the bibliography, which was controlled and standardized by Gianni Marchesi. We were lucky enough to find in Mitch Allen, at Left Coast Press, an enlightened colleague and publisher: we are very grateful to Mitch for his patience and advice, as well as to Jennifer Collier and Katie Peña. Stefania De Petris undertook the task of revising the English of the various articles.

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NOTE ON THE ILLUSTRATIONS OF THE INTRODUCTION

The black frame in [Figures 0.1-4](#) and Plates 1.2, 2.1-2, 3.1 refers to an area measuring 4x4 km and centered around Tell Mardikh, while in Plate 3.2 the area enclosed by the frame is 10x10 km. A complete webGIS of the ECP data will be made available on www.eblachora.eu.

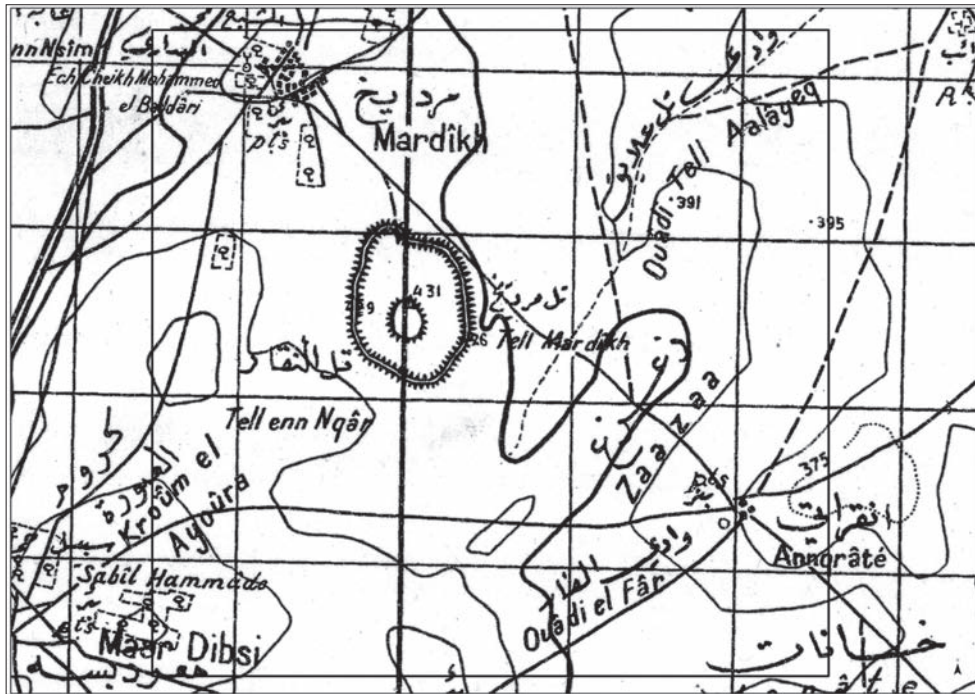


Figure 0.1. Detail of Tell Mardikh in a 1:50,000 topographical map originally drawn in 1943 by the Services Géographiques de l'Armée du Levant (repr. with Arabic captions in 1959).

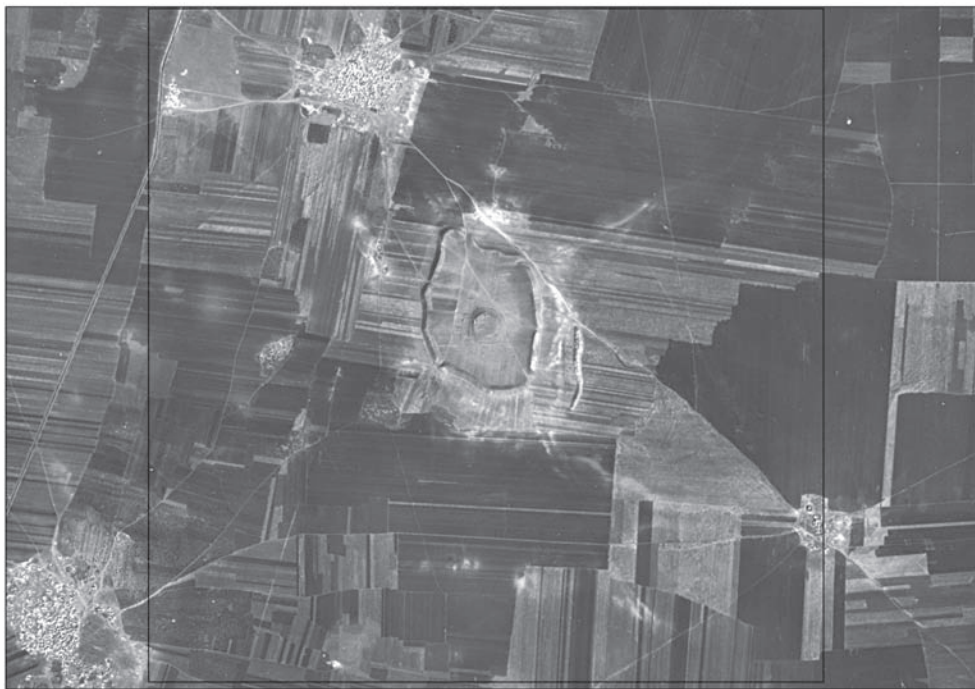


Figure 0.2. Detail of Tell Mardikh in a 1:18,000 aerial photo by the Syrian Air Force (taken on 1st October 1967).

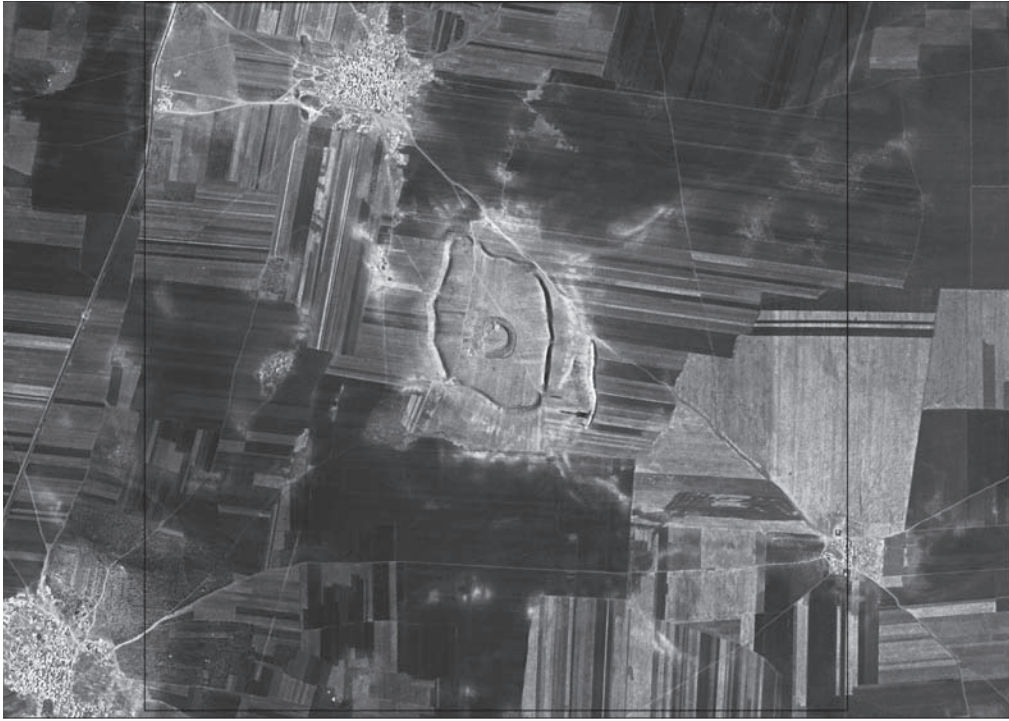


Figure 0.3. Detail of Tell Mardikh in a CORONA satellite image (frame ID DS1107-1122DA057, taken on 31st July 1969); resolution 2 m.

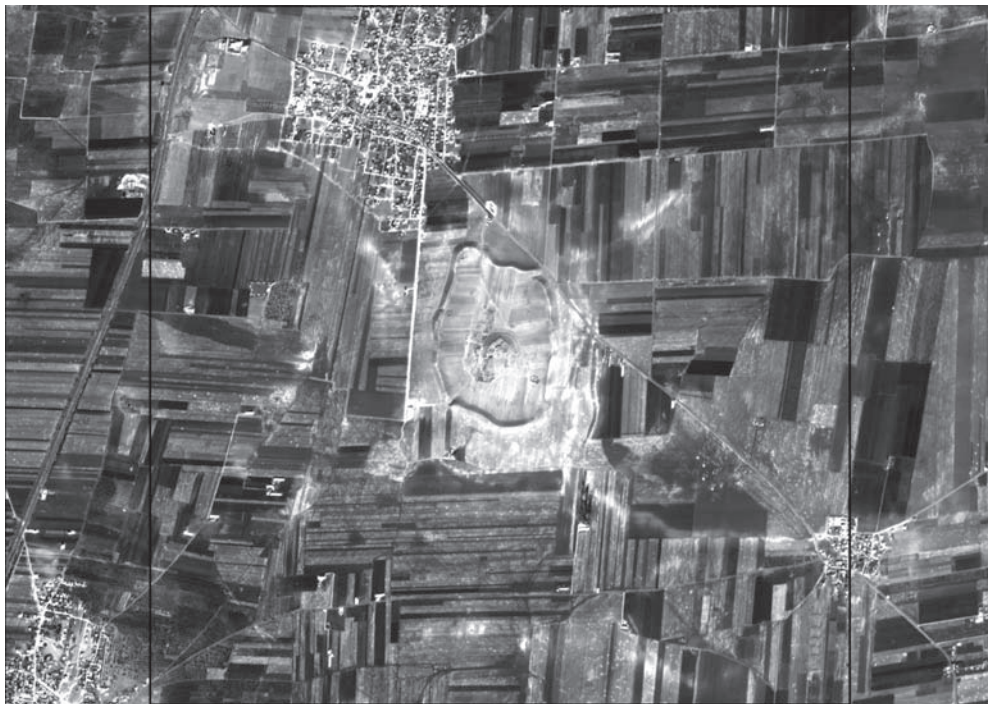


Figure 0.4. Detail of Tell Mardikh in a panchromatic Cartosat-1 satellite image (taken on 27th September 2009); resolution 2.5 m.

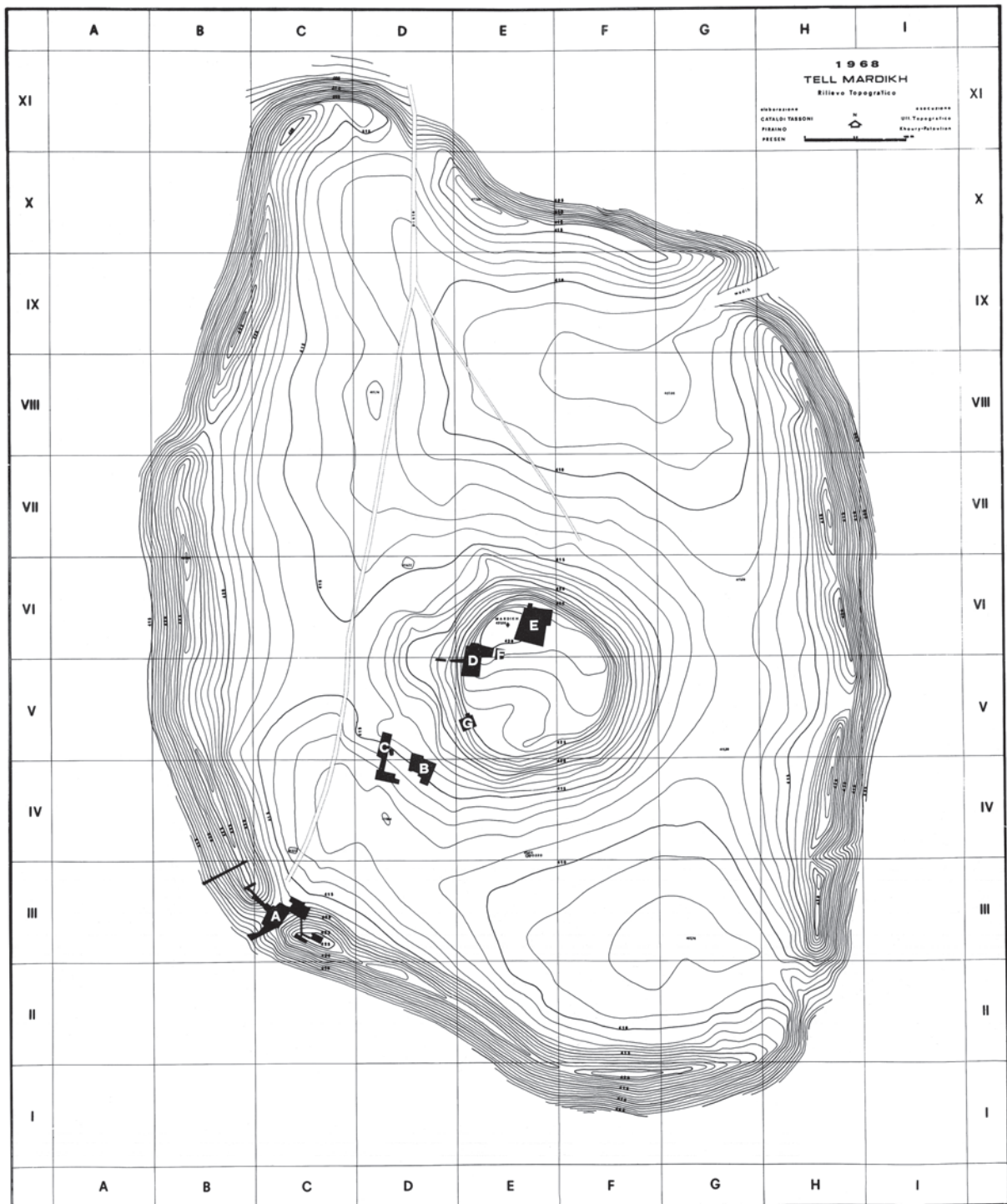


Figure 0.5. Topographical map of Tell Mardikh drawn in 1968; contour interval 1 m. Excavated areas up to that year indicated in black.

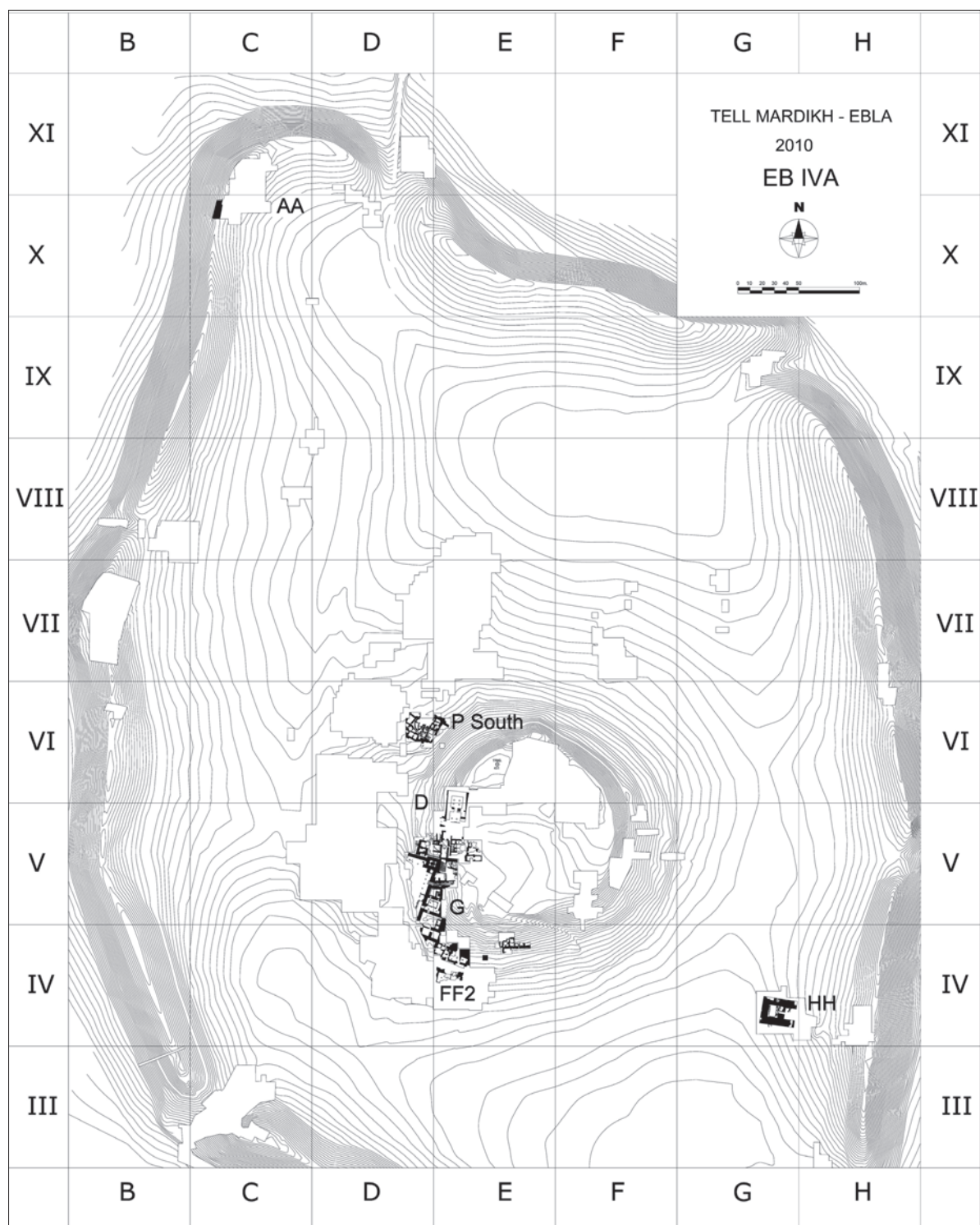


Figure 0.6. Topographical map of Tell Mardikh drawn in 2000-2001; contour interval 0.5 m. Schematic plans of excavated EB IVA monuments up to 2010 are indicated inside relevant excavation areas.

PART 1
Town Archaeology

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CHAPTER 1

A LONG JOURNEY

Fifty Years of Research on the Bronze Age at Tell Mardikh/Ebla

P. Matthiae

The archaeological exploration of Tell Mardikh began in 1964 using a critical perspective characterized by the most advanced and mature techniques of Oriental archaeology set within a historical setting.¹ It aimed at throwing some light on a number of problems of historical interpretation, begun in 1955 with the publication of the final report on the excavations at Tell Atchana, ancient Alalakh, by C.L. Woolley, which drew the scientific world's attention in a totally different way to the possibility that the culture of Western Syria in the Aleppo region had played a primary role in the historical development of the ancient Near East as shown from the results of excavations for the phases of Middle Bronze I-II (ca. 2000–1600 B.C.) and Late Bronze I-II (ca. 1600–1200 B.C.). In particular, themes for new researches and interpretations were opened, to be verified by means of following excavations:

1. The existence of an autonomous culture of Western Syria during the first half of the second millennium B.C., independent from the Mesopotamian and Anatolian worlds;
2. Its originality and importance in the architectural, figurative, and material cultures during the whole second millennium B.C.;
3. The continuity of this culture between MB I-II, Iron Age I (ca. 1200–900 B.C.), and IA-II (ca. 900–720 B.C.);
4. The possibility of tracing back the roots of this culture in the different phases of Early

Bronze I-IV (ca. 3000–2000 B.C.), and especially in the second half of the third millennium B.C.

These debates about the existence of an autonomous culture of inner Syria—from east to west between the Euphrates and the mountains extending to the north into the chains of Lebanon and anti-Lebanon, and from north to south between the Taurus Mountains and the Syro-Arabic desert south of Homs—led, between 1954 and 1962, to the publication of some articles about the figurative culture of glyptics (particularly by Strommenger and Moortgat-Correns), about architectural culture (by Frankfort), and an essay about artistic traditions (by Matthiae). On the basis of these appraisals, the term Old Syrian was adopted, with a deliberate and evident parallelism with the term Old Babylonian for southern Mesopotamia, in order to define the culture of the western Syrian world of the MB I-II and make a clear statement about the autonomy and originality of that culture. This definition was adopted also in different, albeit synthetic, contributions by Porada and Kantor, with particular regard to glyptics.

From the ambitious perspective of studying in depth not only one or the other problem just mentioned, but rather all of them, the site of Tell Mardikh looked quite interesting and extremely promising. The site ([Figure 1.1](#)) is located nearly 55 km south of Aleppo and was quite ignored until 1962, when Matthiae visited it. It had been

previously visited a few times by Ingholt in 1936 and by Moortgat and Hrouda in 1955, among others. Albright stopped nearby but was unable to visit it during a trip from Jerusalem to Baghdad in 1926, after which he wrongly presumed he could identify Ebla with Tell Bia, which is really ancient Tuttul, and correctly identified Tell Hariri with Mari. The reasons this site looked interesting and promising are three: it is very large, nearly 56 ha in area, which pointed to an urban centre particularly important from the political point of view; its main occupation phases, on the basis of the surface pottery, ran approximately between the mid-third and the mid-second millennium B.C.; and a basalt basin carved on three faces was discovered on its surface around 1955—which I could later date to the nineteenth century B.C., the full MB I period—and was carried to the Aleppo Museum.

These three reasons seemed to guarantee that Tell Mardikh might effectively yield final proof of the existence of an autonomous original Old Syrian culture, first identified at Alalakh; that it might lead to the recovery of elements allowing the reconstruction of a continuity with the later phases of the history of Syria; and, most of all, that it might reveal basic evidence of the roots of Old Syrian culture in the second half of the third millennium B.C. When the systematic excavation of Tell Mardikh began, in 1968 (Figure 1.2) a basalt statue fragment was discovered bearing a royal cuneiform inscription of a certain Ibbit-Lim, king of Ebla, dating from the twentieth century B.C., which allowed us to identify the site with ancient Ebla (Figure 1.3). So much information has come from the site since 1975 that Matthiae was able to propose calling the period of EB I-IV “Early Syrian,” to confirm the designation of Old Syrian for the period of MB I-II, and to introduce the terms “Middle Syrian” and “Late Syrian” for the LBI-II and IA I-II respectively.

The configuration of the site of Tell Mardikh is quite typical of the great fortified urban settlements of the Bronze Age, but not common in inner Syria. It is characterized by an acropolis, located approximately in the middle, marked by a low hill slightly higher than the rest of the tell,

surrounded by a large ring-shaped lower town on every side and by a marked peripheral rise, which, looking like a continuous ridge with a strong, nearly continuous, elevation around the whole town, separates it from the surrounding country. These three topographical sectors, still very clearly visible on the terrain, correspond to the fortified citadel, including the large royal public buildings; to the Lower Town, including most of the other public and cult public buildings and the quarters of domestic units; and to the huge rampart city walls surrounding the whole urban centre in the great town of the classical Old Syrian period, which was finally destroyed in the years around 1600 B.C.

When in 1964 the Italian Archaeological Expedition to Syria started the excavations at Tell Mardikh, during the first year the first soundings were made, by means of limited trenches, on the west side of the acropolis (Area D), in two regions of the Lower Town southwest, close to each other (Areas B and C), and on the slope of the most marked opening to the southwest in the high ramparts surrounding the urban centre, which, as it seems quite likely, might be a city gate (Area A). Since the second year, some important monuments of the great town of the beginning of the second millennium B.C. were brought to light with these soundings, including the Temple of Ishtar on the Citadel (Area D) (Figure 1.4), the Temple of Rashap (Area B) in the Lower Town southwest, and Damascus Gate (Area A). The excavations were carried out in yearly campaigns, and during the first decade, up to 1973, they identified and brought to light, sometimes only in part, several other very important buildings of the same archaic (MB I) and classical (MB II) Old Syrian periods, between 2000 and 1600 B.C., like the Temple of Shamash (Area N) in the Lower Town north, the Sanctuary of Royal Ancestors (sector B South), and, most importantly, the Royal Palace E (Area E), albeit for a small part, and the Fortress (Area M) on the southeast side of the town walls.

The second decade of excavation activities started in 1974 with the identification on the southwestern slopes of the acropolis of Royal Palace G (Area G),

of the high Early Syrian period (EB IVA), between 2400 and 2300 B.C. (Figure 0.6) This period is marked by the crucial discovery in 1975 of the famous State Archives (Figures 1.5, 1.6), whose excavation was completed in 1976. During the same decade, while different sectors of the great complex of the Early Syrian Royal Palace G were being explored, including the Administrative Quarter, the Southern Quarter, and the South and West Units of the Central Complex, the systematic exploration of the later classical Old Syrian Ebla started in the Lower Town west, with the identification and excavation of the extended Western Palace (Area Q) and of three important tombs, partially violated, of the Royal Necropolis stretching below it.

During the third decade of systematic exploration, most of the important Old Syrian monuments of the Lower Town were brought to light, including the Northern Palace (sector P North), Sacred Area of Ishtar with Temple P2 (sector P Centre), the Cultic Terrace (sector P South), and the Archaic Palace (sector P North) founded in the late Early Syrian period (EB IVB), an antecedent of the Northern Palace from MB II (Figure 1.7). At the same time, on the acropolis the site of at least one royal tomb was identified, dating to the Archives period, but completely sacked or never employed (Area G West). In 1984, a limited sector of Building G2 (Area G South) of the archaic Early Syrian period (EB III, around the mid-third millennium B.C.) was also brought to light.

During the fourth decade of excavations, the greatest attention was given to the rampart fortifications of the archaic and classical Old Syrian town, with the exploration of the Western Fort (Area V), the Northern Fort (Area AA), the Euphrates Gate (Area BB), Aleppo Gate (Area DD), the peripheral residential quarters (Area Z), and the quarters close to the citadel (sector B East). The research activities in the Lower Town, which mark the fifth decade until 2008, yielded some important complements to the excavation of Royal Palace G, but also allowed the discovery of the Southern Palace (Area FF) (Figure 1.8), the recovery of a complete quarter of private houses

of the classical Old Syrian period quite well preserved (sector B East), and, most of all, starting in 2004, the identification, in the Lower Town southeast, of the great Temple of the Rock (Area HH), of the high Early Syrian period (Plate 4:1), with the first well-preserved remains of the late Early Syrian town of the last centuries of the third millennium B.C. Research on the Acropolis was resumed during the second half of the fifth decade, until 2010, and produced a very important result with the identification of the high Early Syrian Red Temple (Area D) in the western region of the central hill. The same period was marked by the beginning of the systematic exploration of Royal Palace E of the Old Syrian period, reemployed during the early Middle Syrian period (LB I). Due to its huge size, the palace was called Royal Citadel (Areas E and F).

The systematic exploration of Tell Mardikh, started in 1964, in 1968 already led to the identification of the site with ancient Ebla, with the discovery of Ibbit-Lim's inscribed statue. Later on, in 1975, the finding of the Royal Archives produced a large amount of evidence about the most ancient history not only of Ebla, but also of a large part of Syria during the third quarter of the third millennium B.C. In those first years the outline of Ebla history through nearly one millennium of history, between the mid-third and the mid-second millennium B.C., became clear.

Following the still obscure centuries in the history of the first urban formations in Mesopotamia, to which the virtually unknown and certainly limited settlement of Mardikh I of the protohistoric period (ca. 3500–3000 B.C.) dates back, the true urban development of Ebla probably took place during the Early Dynastic I–III periods of Mesopotamia (corresponding to the age of the Old Kingdom of Egypt) in the still partly obscure phase of Mardikh IIIA (ca. 3000–2400 B.C.), corresponding to the archaic Early Syrian period (EB I–III). The first flourishing of Ebla took place during Mardikh IIB1, the age of the Royal Archives (ca. 2400–2300 B.C.) and the high Early Syrian period (EB IVA), corresponding to the last decades of the Early Dynastic IIIB period and to

the first years of the Akkad dynasty in southern Mesopotamia, when Egypt was ruled by the first pharaohs of the 6th dynasty of the Old Kingdom (Figure 1.9).

After the violent destruction of the first Ebla, quite likely by Sargon of Akkad, the renaissance of the second Ebla during Mardikh IIB2 (ca. 2300–2000 B.C.), in the late Early Syrian period (EB IVB), took place when Mesopotamia was ruled, in succession, by the Akkad dynasty, the 2nd dynasty of Lagash, and the 3rd dynasty of Ur. At the same time Egypt was swept, during the First Intermediate period, by very harsh social disorders to which the 11th Theban dynasty put an end, founding the Middle Kingdom.

A severe destruction devastated the second Ebla too, perhaps a few years before the end of the late Early Syrian Period. The new settlement of the third great Ebla of Mardikh IIIA (ca. 2000–1800 B.C.) in the archaic Old Syrian period (MB I) followed, and the city was still an important centre during the following classical Old Syrian period (MB II) of Mardikh IIIB (ca. 1800–1600 B.C.). In those four centuries Mesopotamia was ruled by the dynasties of Isin, Larsa, and Babylon I, and in Egypt the glorious 12th dynasty of the Middle Kingdom and the following weaker dynasty were in power, before being finally overcome by the Asiatic Hyksos.

The destruction of the third Ebla around 1600 B.C. marked the end of the last great town, after which more modest settlements followed in Mardikh IVA and IVB (ca. 1600–1200 B.C.), in the Middle Syrian period (LB I and II), and during the centuries of fights and checks among the Mitanni empire, the Egyptians of the 18th and 19th dynasties of the New Kingdom (Figure 1.10), the Hittites of the Imperial age, and the Assyrians of the Middle Assyrian kingdom.

With the end of the Bronze Age, probably also the memory of Ebla was lost, and the small village of Mardikh VA-C (ca. 1200–535 B.C.) occupied a very limited region of the great older urban settlement in the centuries of the Late Syrian period (IA I–III), during which the Luwian and Aramaean princes of Syria tirelessly and uselessly

tried to contrast the expansion of the Assyrian empire first, and of Babylon afterward. The last two settlements were during Mardikh VIA-B (ca. 535–55 B.C.) in the Persian-Hellenistic period, which featured a rural renaissance, and Mardikh VIIA-B (ca. 55 B.C.–600 A.D.) in the Roman-Byzantine period. During the latter a small monastic community of stylite hermits finally settled down among the ruins and pillaged them, putting an end to the history of the long decadence of one of the most glorious towns of the ancient Orient.

The discovery of a torso probably dating to the twentieth century B.C. and portraying Ibbit-Lim—who called himself “king of Ebla,” using the peculiar word *mekum*, a probable dialect variant of the classical form *malikum*—proved that Tell Mardikh was the town mentioned in an inscription of Sargon of Akkad and in one of Naram-Sin of Akkad, and that it was probably the seat of an important kingdom. This led to intensify the efforts to reach the urban centre of the EB IV, contemporary with those two great sovereigns, located below the remains, often quite well preserved, of the great Old Syrian town of MB I–II. One of these soundings, on the west slope of the acropolis in 1973, was particularly lucky: it reached the extraordinarily well-preserved northeast tower of the Court of Audience of Royal Palace G (7.30 m high), and this was the beginning of the exploration of Royal Palace G. This complex of buildings probably stretched over a large part of the Acropolis, and was in part lost due to the damages caused by the superimposition of the following periods; the regions thus far brought to light, over an extension of nearly 4,500 m², were the quarters, mostly with official functions, of the peripheral west area of the palace, placed on the southwest slope and on the western top of the acropolis. The exploration of the different sectors of the Royal Palace and of several more additions in the peripheral south was accomplished mostly during the years 1973–1990. Western and northwestern regions were explored between 2002 and 2007.

The results of the soundings suggest that the extension of the town of the high Early Syrian

period was quite alike that of the following great Old Syrian town. In fact, the line of the walled fortification of the older period is apparently everywhere below the huge earthen work rampart of MB I. Sections of the walled fortification of EB IVA were brought to light in Area AA, in the northwestern sector of the later fortification (Figure 1.11); moreover, hints of the presence of this older wall are also found in Area V, on the western rampart, and in Area A, near the later Damascus Gate (southwestern city gate).

Besides the large sectors of Royal Palace G and the portion of the city walls in Area AA, the EB IV buildings brought to light are Building P4, in sector P (south of Area P) in the Lower Town northwest, the Temple of the Rock in Area HH of the Lower Town southeast, and the Red Temple in Area D, on the western edge of the Acropolis.

In the southeastern region of the large Area P, which includes Temple P2, the Lions Terrace (Monument P3), and the Sacred Area of Ishtar of the Old Syrian Period, the complex Building P4 was found below the Cisterns Square—a square without buildings, stretching to Temple P2 to the north, Monument P3 to the west, and the Citadel foot to the southeast (see Marchetti, in this volume). This is certainly a multifunction structure, including small closely packed rooms where activities such as food production, goods storage, and some handicraft took place. Part of the perimetrical walls were found only to the southeast and perhaps on the northeastern side, so the architectural type of Building P4 is difficult to define. Another problem still unsolved is whether Building P4 belonged to, or was related with, the public buildings of the great high Early Syrian town of the Archives. Two possibilities are equally plausible, and both can be taken into account: on the one hand, it is likely that the building was a peripheral annex to Royal Palace G, with a main function as a handicraft workshop (Plate 4:2), and on the other hand, it is possible that the building was part of a production unit of a cult area not clearly identified yet, located below the Sacred Area of Ishtar of the Old Syrian period.

The Temple of the Rock (Area HH, Temple HH) in the Lower Town southeast (Figures 1.12, 1.13),

near the southeastern city gate of the Old Syrian period, is probably located in the same place as a high Early Syrian city gate called in the texts Kura's Gate, from the name of the most important god of the town. The temple was excavated in the years 2004–2007 and was given its name because it is built on an uneven rock layer that has not been flattened. This was probably the most important cult building of the town, and was probably dedicated to Kura, head of the pantheon; it had an axial plan, was 28 m long and 21.5 m wide, its outer walls were ca. 6 m thick, and it featured a cella and a vestibule with antae. The temple had a peculiarity, unique in the architectural culture of Bronze Age Syria, namely that the cella, a moderate *Breitraum* 8.3 m long and 10 m wide, had the same size as the vestibule, which thus looked quite deep. The Temple of the Rock, quite likely the one mentioned at the beginning of the “ritual of kingship” of Ebla, was destroyed at the end of EB IVA, with the collapse of the whole town of the age of the Royal Archives, and was abandoned after some purification rites. Over its imposing ruins, a much smaller cult building was erected during EB IVB, Temple HH4, 17.3 m long and 10 m wide, with a *Langraum* cella 8.1 m long and 6.5 m wide, and a vestibule 5.2 m long (Figure 1.14). This temple too, like the Temple of the Rock, was oriented to the east; later on a second cult building of an even smaller size was erected to its side, Temple HH5, also featuring two rooms on the same axis, but without antae. Temple HH4 and Temple HH5 were destroyed and razed to the ground at the end of EB IVB, around 2000 B.C.

The Red Temple (Area D, Temple D2), on the west edge of the acropolis, after a first sounding in 1968 was explored in 2007 by means of some very limited sounding (enough to define its size and space articulation) because it is located precisely below the great Old Syrian Temple of Ishtar (Temple D) (Figure 1.15). The Red Temple, 24.2 m long and ca. 17 m wide, owes its name to the deep red color of its typical mud bricks in the trench along the west side of the Acropolis, which were noticed since the first excavation in 1964. Its structure was similar to that of the Temple of the Rock, as it was an *in antis* temple featuring only

cella and the vestibule. Yet, unlike the Temple of the Rock, it was a moderate *Langraum*, because the cella was only 10.2 m long and ca. 9.4 m wide. The cella was divided into three short naves by four columns, of which two big cylindrical limestone bases were found in place; in the vestibule, ca. 6.7 m long and 9.4 m wide, there were two columns, whose limestone bases, identical to the cella bases, were also found in place. The Red Temple (Figure 1.16) was probably built late in the high Early Syrian period, certainly during the reign of the last king documented by the Royal Archives, namely Ishar-Damu. Its construction was probably mentioned in an economic text from the archives (TM.75.G.1464, r. XIV 12-17), which recorded a huge delivery of silver (50 minas) “in order to make the Temple of Kura.” Undoubtedly, the Red Temple is the same as the Temple of Kura mentioned in the “ritual of kingship” as the sanctuary of the town deity standing in the SA.ZA_x^{ki}, certainly the ancient name for the palace area of the Royal Archives. Over the ruins of the Red Temple, destroyed with Royal Palace G at the end of EB IVA, a much smaller cult building, Temple D, was erected in EB IVB. The temple was only ca. 13.5 m long and 10.5 m wide, and it is possibly the oldest in antis

temple with axial structure, divided into cella, antecella, and vestibule, with a cella featuring a marked *Breitraum* plan.

Royal Palace G, the Temple of the Rock, the Red Temple, and Building P4, with a section of the town wall of the first Ebla of the high Early Syrian period of the Royal Archives, cannot be compared with the rich variety of architectural structures of the third Ebla of the Old Syrian period. However, thanks also to their frequently excellent state of preservation, they yield evidence of the greatest importance of Ebla in the third quarter of the third millennium B.C., when the town was considered by Sargon of Akkad and Naram-Sin of Akkad, in different ways and for different reasons, one of the most important urban centres of their times.

NOTES

- 1 The bibliography about the archaeology of the high and late Early Syrian Ebla is today very large, and the studies about different aspects of the architecture of the town of the Royal Archives are many. See the references assembled in Matthiae (2008a, 2010b) and the bibliography listed at the end of this volume.



Figure 1.1. Ebla, general view of the tell, from the north-east.

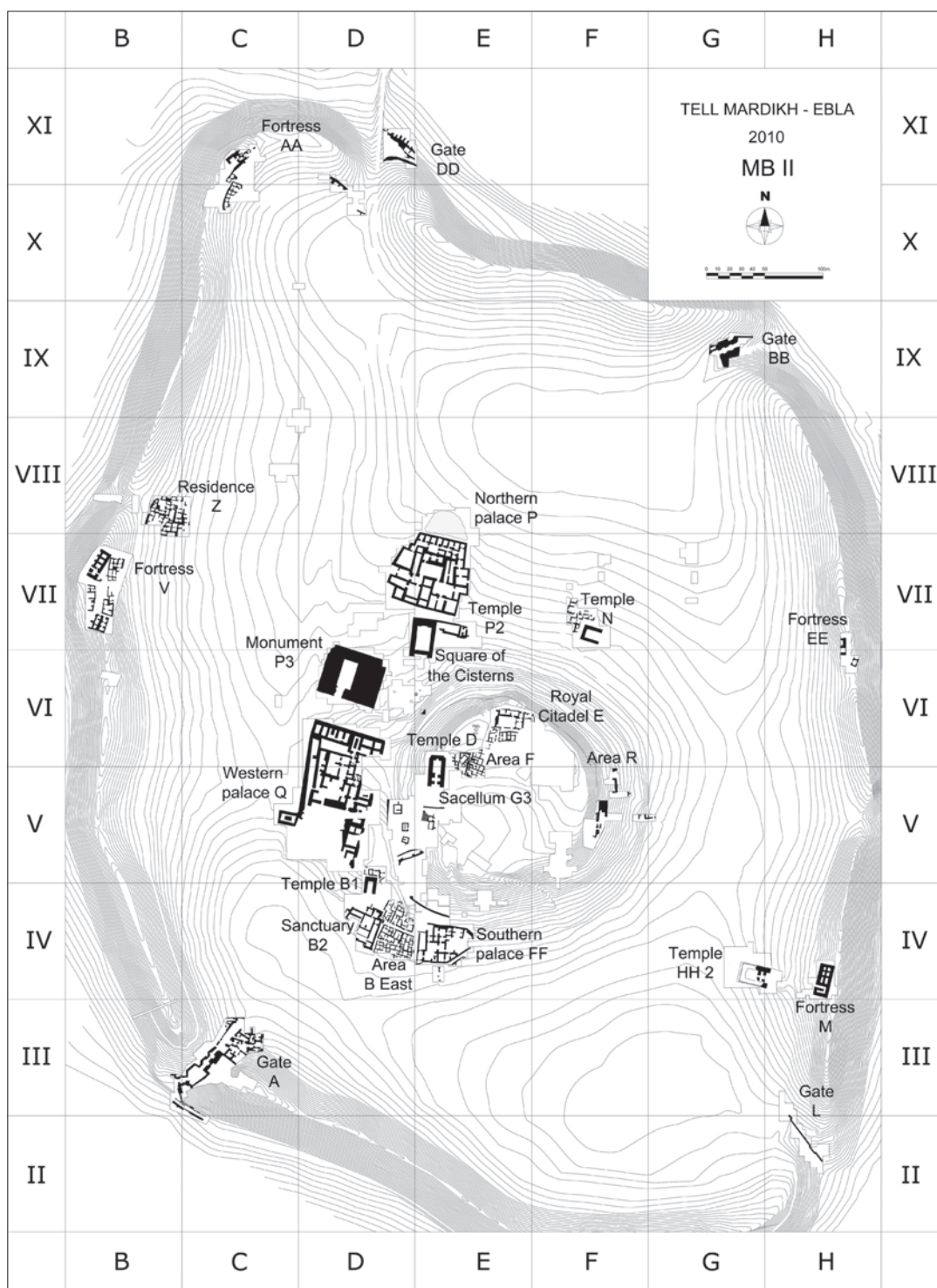


Figure 1.2. Topographical map of Tell Mardikh with schematic plans of excavated MB II monuments up to 2010 indicated inside relevant excavation areas.



Figure 1.3. Ebla, inscribed torso of the archaic Old Syrian basalt votive statue of king Ibbit-Lim, TM.68.G.61, from the Acropolis south-western sector, ca. 2000 B.C.



Figure 1.4. Ebla, the Central Complex of Royal Palace G, EB IVA, ca. 2400–2300 B.C., and the Temple of Ishtar, MBA, ca. 2000–1600 B.C., in the background, from the south.



Figure 1.5. Ebla, Royal Palace G, tablets in place along the northern and eastern walls of the Great Archive L.2769 in the Administrative Quarter, from the south-west, EB IVA, ca. 2300 B.C.

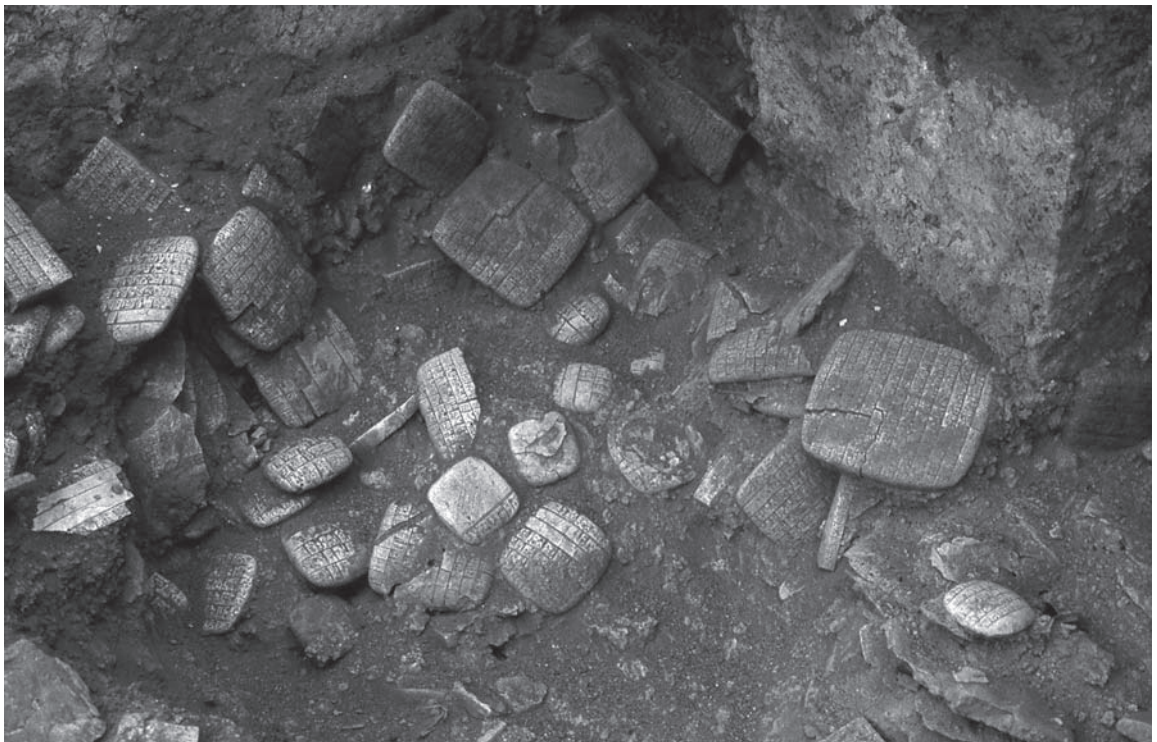


Figure 1.6. Ebla, Royal Palace G, tablets in place along the northern and eastern walls of the Great Archive L.2769 in the Administrative Quarter, from the south-west (detail), EB IVA, ca. 2300 B.C.



Figure 1.7. Ebla, Area P North, the remains of the Archaic Palace, EB IVB-MB IA, ca. 2100–1900 B.C., and of the Northern Palace, MB II, ca. 1800–1600 B.C. from the north; the Acropolis is in the background.



Figure 1.8. Ebla, Area FF, the Southern Palace, from the north-west, MB II, ca. 1800–1600 B.C.

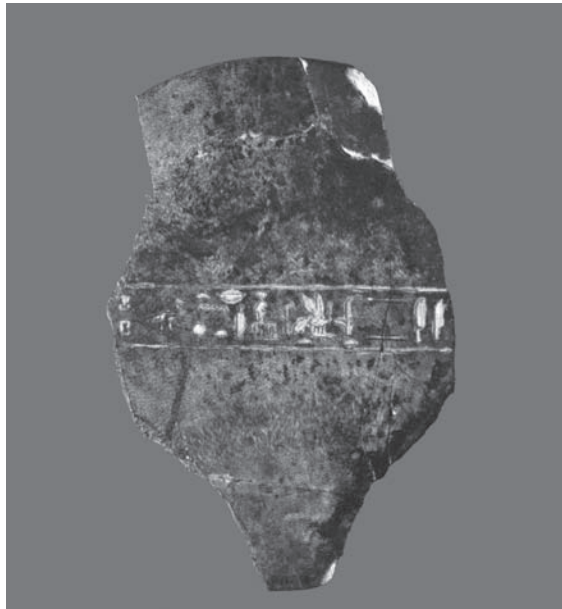


Figure 1.9. Ebla, Royal Palace G, alabaster lid bearing the titles of Pharaoh Pepi I, TM.77.G.600, 6th Dynasty, ca. 2300 B.C.



Figure 1.10. Karnak, Temple of Amon-Ra, detail of the cartouche with the toponym of Ebla, carved in hieroglyphic writing on the seventh pillar, among the cities conquered by Pharaoh Thutmosis III, ca. 15th century B.C.



Figure 1.11. Ebla, North West Rampart (Area AA), mud-brick city wall from the north-east, EB IVA, ca. 2300 B.C.



Figure 1.12. Ebla, Area HH, Temple of the Rock in the Lower City south-east, from the south, EB IVA ca. 2400–2300 B.C.



Figure 1.13. Ebla, Area HH, Temple of the Rock in the Lower City south-east, detail of the cella L.9190 with the elliptical cavity and the three wells, from the south, EB IVA, ca. 2400–2300 B.C.



Figure 1.14. Ebla, Area HH, Temples HH4 and HH5, general view of the two cultic buildings from the north-east, EB IVB, ca. 2050 B.C.



Figure 1.15. Ebla, Area D, the Temple of Ishtar on the Acropolis, MB I-II, ca. 2000–1600 B.C., and the remains of the temples of EB IVA, ca. 2400–2300 B.C., and EB IVB, ca. 2300–2000 B.C., from the south.

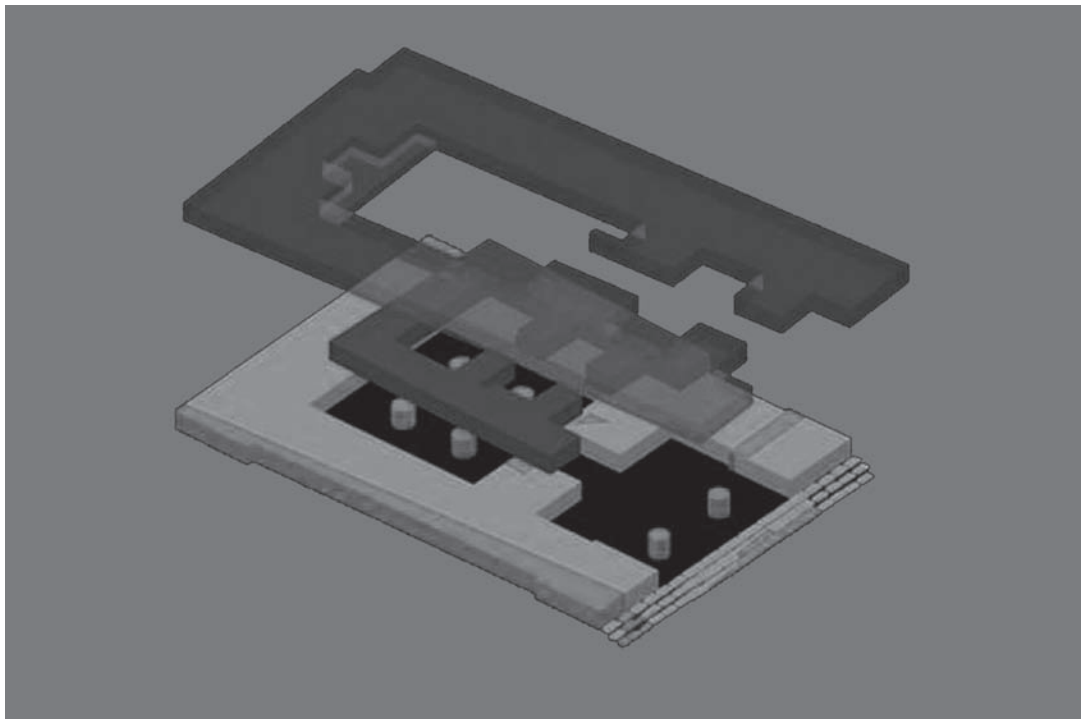


Figure 1.16. Ebla, superimposition of the temples in Area D, isometric view, EB IVA-MB II, ca. 2400–1600 B.C.

CHAPTER 2

THE ROYAL PALACE

Functions of the Quarters and the Government of the *Chora*

P. Matthiae

The systematic excavations of Royal Palace G at Ebla, first singled out with one limited yet very fortunate sounding in 1973, were developed during the years 1974–1990, with an almost exclusive concentration of workmen in this area during 1975 and 1976, when the Royal Archives in the eastern sector of the Court of Audience were found. Later on, they were carried out at the same time as the beginning of the exploration of the Old Syrian public buildings in the Lower Town. Besides some short-term operations between 1990 and 2002 in the western and southern sectors of the Central Complex along the edges of the Acropolis, substantial enlargements of the excavations were made between 2002 and 2007 on the western edge of the Court of Audience, the southern limits of the Southern Quarter, and in the region of the Northern Quarter next to the Court of Audience.

Probably Royal Palace G originally stretched over a large part of the Acropolis (Matthiae and Marchetti, Introduction, [Figure 0.6](#)), possibly with separate units, and in some peripheral regions of a primarily architectural and functional importance; it also stretched at the foot of the Acropolis (as happens with the Court of Audience). The state of preservation of the structures of the palace is very good in all the sectors located on the Acropolis slopes ([Figure 2.1](#)), where no significant superimpositions were built after the end of Early Bronze IVA. The northeastern tower of the Court of Audience is still ca. 7.4 m high, slightly sloping from north to

south and from east to west; the walls of the Great Archive L.2769, along the east side of the Court of Audience, are ca. 2.6 m high. Further to the west, the Court, as well as all the other sectors on the same level as the Lower Town, is lost, because the lowest structures of Royal Palace G were levelled and sometimes pulled off by the superimposition of the scarps of the inner fortification of the Old Syrian Citadel.

It is likely that the original surface of the high Early Syrian Royal Palace of Ebla, called in the texts SA.ZA_x^{ki}, and now identified as a whole as Royal Palace G ([Figure 2.2](#)), could reach 20,000 m², while the area thus far brought to light extends over ca. 4,500 m² ([Figure 2.3](#)). The sectors brought to light so far are: the Central Complex, with the Monumental Stairway, which occupied quite a large part of the top of the Acropolis, and was by far the largest area of the palace, mainly used for residence, storage, services, and possibly for handicraft productions; the Administrative Quarter, with the Throne Room, the Court of Audience, the Northern Quarter, and the rooms of the Royal Archives, which was a basic peripheral sector located on the southwest slopes of the Acropolis; and the Southern Quarter, probably with residential functions, including the Hall with Painted Plaster located at the southwestern foot of the Acropolis ([Figure 2.4](#)), probably with a religious function (Matthiae 2004, 317–24).

The name Central Complex was given to the whole central sector of the monumental building

on top of the Acropolis. Only peripheral sectors of it were excavated, on the hilltop and in limited parts of the west and south slopes of the Acropolis itself. The complex included the Monumental Stairway, a staircase more than 22 m long, which bridged a difference of ca. 5 m in elevation between the Court of Audience and the western region of the Acropolis: this was probably the only public entrance to the upper palace quarters. Two rooms opened onto the north side of the Gateway (L.2834 and L.2890): these were the kitchens of the Court of Audience, where more than eight fireplaces were located, standing against the east wall of the inner room (L.2890). A large amount of vegetal remains, possibly used for the preparation of herbal infusions (see Wachter-Sarkady, in this volume), was found here, clearly meant for the guests in the nearby Court of Audience and Throne Room (Matthiae 2010b, 80–81, fig. 34). The northwest wing, a small sector on the top of the west slope of the Acropolis to the north of the Court of Audience, included two rooms, important for their findings: in 1974 the first forty-two tablets of the Royal Archives were found scattered on the floor of the south room (L.2586), near a jar bottom fixed to the floor, while in 1975 several remains of wood inlays (Figure 2.5) were recovered in the north room (L.2601), clearly belonging to a table and to a throne with armrests decorated in relief, with mother-of-pearl inlays and a gold leaf revetment.

The West and South Units were located respectively at the southern and western edges of the Acropolis top, and were both used for services: the West Unit included two sectors (Figure 2.6), to the north and to the south, divided by a large terracing wall (M.3905), because the rooms to the south lay 1–1.6 m lower than the north ones. All the west rooms of the West Unit brought to light, to the north (L.3914) and south of M.3905 (L.3926 and L.3932), featured benches for a large number of basalt grinding stones for cereals. Several other rooms near those meant for grinding featured round lacunae in the floors, which suggest the presence of medium-sized storage jars.

Below the easternmost rooms thus far brought to light, 5.85 m under the level of the floors of the West Unit, two rooms of Hypogeum G4 were located: this was a large tomb featuring a sophisticated masonry, heavily damaged by pillages until the Persian Period (Matthiae 1995b, 655–59; 1998, 561–63; 2000, 577, fig. 8), but certainly belonging to Royal Palace G. It had probably been built at the end of EB IVA, possibly at the time of the last king of the Archives, Ishar-Damu, and quite likely it was never used, as the town was destroyed (Matthiae 1997). The texts of the Royal Archives bear evidence to the fact that the oldest kings of the Ancestors' list were buried at Binaš, probably near the modern town of Idlib, and the last ten kings in the ancient site of Darib, almost certainly the same as modern Atareb (to the northwest of Ebla), where a very damaged limestone head was found in the past, probably dating back to the Archives age. On the other hand, it is probable that only in Ishar-Damu's times the custom to bury the sovereigns in different places, certainly related, perhaps for clan reasons, to the *chora* territory, was abandoned and replaced with the properly urban tradition of the Mesopotamian world to bury the kings under the royal palaces (Matthiae in press a).

The South Unit of the Central Complex, a limited sector of which was brought to light more than 50 m southeast of the Monumental Stairway, in the upper part of the south slope of the Acropolis, featured two lines of small rooms running from east to west (seven rooms at least of the south range are preserved), located to the north of a huge terracing wall, also running east–west (M.3470). A third less-preserved line of room was located south of the same wall (Matthiae 2010b, 381). These rooms belonged to a service quarter, apparently used to store pottery and perhaps cereals, and therefore related to the processing of the products of the *chora* agriculture.

The only other sector of Royal Palace G thus far brought to light and not directly related to the Court of Audience and the Administrative Quarter is, to the south, the Southern Quarter, stretching to the southeast of the Administrative Quarter, whose exploration started in 1979

(Matthiae 1980, 94–99). This wing of the palace was built at the foot of a high terracing wall (M.3117) running from northwest to southeast, and included several rooms with the same orientation. Three thin walls at least were built orthogonally to the southern limit of the Quarter, and were cut off by the superimposition of the scarp wall of the inner fortification of the Old Syrian citadel: for this reason, the relation between these walls and the nearby Hall with Painted Plaster (Matthiae 2004, 317–24; Di Ludovico and Ramazzotti 2009; 2012) could not be explained so far; the latter was quite likely a very peculiar cult place, possibly related to the goddess Ishkhara (Matthiae 2010b, 90–91). The function of the Southern Quarter is hard to determine, but it is likely that it was a secondary, peripheral residential wing of the palace: it yielded, from the floor of room L.3462, three cuneiform tablets, which were clearly there to be read by one resident and which, for their administrative content, did not belong to any of the Archives found in the Administrative Quarter (Matthiae 1983, 542–49).

The most important sector of Royal Palace G for function and findings, and the best preserved one, is by far the complex including the monumental Court of Audience and the large Administrative Quarter (Figure 2.7), where the rooms of the Royal Archives were located: it is situated at the same elevation as the lower town, and its ruins were protected by the slope of the Acropolis. In the northeast corner of the Court of Audience there was the tower, inside which ran the Ceremonial Staircase, which was the reserved passage for the king and the highest officials and connected the royal apartments of the Central Complex on the Acropolis with the Court of Audience. Behind the north façade of the Court was located the Northern Quarter, a group of storerooms directly communicating with the Court. It is possible that this complex, certainly the government seat, and the reception area of Royal Palace G, were called in the Archives by the name of SA.ZA_x^{ki}, though an alternative—perhaps a more likely one—is that this name indicated the whole complex of the palace, meaning all the state buildings on the Acropolis of Tell Mardikh.

The Court of Audience was a large open space (L.2752) with porches along the two excavated and partially preserved north and east walls. It was ca. 42 m wide; the length can only be hypothesized, but it was probably not less than 60 m. The columns were placed ca. 4 m one from the other and were fixed into the floor, resting on limestone bases placed ca. 0.50 m deep into the ground. Two antae protruding from the tower of the Ceremonial Staircase marked respectively the east onset of the north porch and the north onset of the east porch. In the middle of the north porch there was a rectangular dais (Figure 2.8) featuring steps only to the west and to the south, certainly meant for the royal throne. Four doors of different sizes and with different functions opened into the Court of Audience: the biggest one was the Monumental Stairway, the public entrance to the Central Complex, opening through the north sector of the east porch; ca. 18 m further to the south there was the remarkable entrance to the Administrative Quarter, with basalt thresholds and decorations of mother-of-pearl inlays; to the east end of the north porch a door opened into the Ceremonial Staircase, whose steps were decorated with mother-of-pearl inlays, in rosette patterns; near the west side of the royal dais, a secondary entrance pierced the north wall, leading into the Northern Quarter.

The Administrative Quarter is a large sector of outstanding importance: it has a trapezoidal shape and stretches for 44 m on the south–north axis and for ca. 13 m on the east–west axis, between the east porch of the Court of Audience and the massive south–north terracing wall (M.8565) leaning against the east façade of the Court (M.2751), 2.80 m thick. It was built on the basis of an organic and unitary plan with a strong monumental impact, as the thickness of its perimetric walls suggests the presence of high walls, calculated in ca. 12/14 m. Only at a later stage it was integrated, in its façade, by a limited covered vestibule including two rooms (L.2875 and L.2769), which was created by filling up the spaces between the wooden columns in the south section of the east porch with a thin single line of mud bricks.

Thus, the Administrative Quarter stretched between the Monumental Stairway to the north and the independent Southern Quarter to the south and included several rooms placed north and south of a small inner court (L.2913), 10x12 m large, directly accessible through the vestibule of the east porch. It probably featured porches leaning on four columns, similar to those of the Court of Audience. North of the small court (L.2913), the so-called Trapezoidal Archive (L.2764) opened to the west, featuring high benches along two walls and a small storeroom to the east; to the east, a four-ramp staircase led to the upper storey and to the gallery. The south sector was more articulated, more monumental, more important in its functions, and certainly very high too, probably reaching the height of the north sector, but featuring only one story. On the south side of the small court, through the porch L.2982, a room could be entered, L.2866, which is the largest of the palace, ca. 16x11 m: this was the Throne Room. Inside it, against the east wall, three small rooms were later built (L.8495, L.8778, L.8496) by lining up one row of mud bricks, and these were used as temporary store for cuneiform documents related with the use of the Throne Room. In the middle of the south side there was probably a dais for the royal throne, and north of it a door led into two approximately square smaller rooms (L.2982, L.2984), the South Annex, which did not have any other entrance (Matthiae 2004, 310–18).

The Court of Audience and the Throne Room were two large reception spaces: the first one was larger and in the open air while the second was smaller and covered, but they had the same functions, and in all likelihood were alternatively used according to the amount of people attending and to weather conditions. Though oriented one to the north and the other to the south, these two spaces for the audience were conceived for the same needs, as it is proven by the presence in both spaces, near the throne location, of a door opening into the larger rooms of the Northern Quarter to the north and the smaller South Annex to the south. The Northern Quarter and the South Annex had the same function as storerooms for the goods received or delivered

in the two large reception spaces (Figure 2.9). This official sector of the Eblaite Royal Palace G can be compared, in terms of structure and architectural pattern (Matthiae 2010a), with the contemporary royal palaces of Tell Khura— which, according to one hypothesis (Archi, Piacentini, and Pomponio 1993, 90–91), may be the ancient Abarsal (Archi 1989b)—and of Tell Bia, the ancient Tuttul (Archi 1990c).

In different rooms of the Administrative Quarter, more than 17,050 inventory numbers of cuneiform texts of the Royal Archives were found (Figure 2.10), among which ca. 2,000 are complete or nearly complete documents, more than 5,000 are large fragments, and the others are chips with some lines of writing. It has now been inferred that the texts originally kept in the Royal Archives, before the damages of pillage, fire, and collapses, numbered between 4,000 and 5,000.

The places where texts were found are the following: the Great Archive (L.2769), in the vestibule of the Administrative Quarter (Figure 2.11), under the east porch of the Court of Audience, yielded ca. 14,700 inventory numbers; the Small Archive (L.2712), in the north corner of the east porch of the Court of Audience, ca. 900 inventory numbers; the Trapezoidal Archive (L.2764), in the north sector of the Administrative Quarter, under the east porch of the Court of Audience, ca. 650 inventory numbers. As to the function of the individual archives, there is no doubt that, for the variety and number of the texts, and for the presence of three wooden shelves 0.50 m high and 0.80 m deep, the Great Archive, 3.50x5.30 m large (Figure 2.12), was the main storeroom for written documents. In this regard, it is also significant that it was located midway between the two royal daises of the Court of Audience and the Throne Room. We can conclude that the tablets were permanently kept on the planks of the wooden shelves of the Great Archive (L.2769) (Plate 5:1), and they were temporarily preserved on the suspended two shelves of the Small Archive (L.2712), on the high mud-brick benches of the Trapezoidal Archive (L.2764), and on the low mud-brick benches of the outer vestibule (L.2875).

The tablets from the Small Archive were for the most part registrations of rations of cereals, bread, oil, and malt bread for beer preparation. Many allotments were for the court, that is the king, the queen, their children, the princes of other cities visiting Ebla, the Elders, but also the gods, the messengers sent to faraway towns like Mari or Nagar, the female servants assigned to spinning and grinding cereals, and labor units situated in suburban areas. Some documents register deliveries of oil to the sovereigns of some not so distant towns, like Urshaum, Tuba, Emar, or Burman. A few tablets deal with animal consignments and others with distributions of gold and silver, or allotments of oils and perfumes or objects made of prized woods to some officials. It has been maintained that the documentation of the Small Archive L.2712 refers to the last months of the life of the town, and it is possible that the tablets were meant to be destroyed by Eblaite officials, as is proven by the fact that the documents preserved in the Great Archive (L.2769) show different typologies from those of the Small Archive (L.2712; Archi 1986a, 74–75).

The function of the Trapezoidal Archive (L.2764) inside the Administrative Quarter is more difficult to ascertain: although it yielded lenticular tablets dealing with the registration of precious metals, as well as of ovines and draft animals, most documents deal with the bookkeeping of barley deliveries on behalf of villages. This archive, perhaps a place of temporary storage of documents, seems to be related in a specific, albeit perhaps not exclusive, way with the administration of the Eblaite *chora*.

The content of quite a number of documents collected in the vestibule (L.2875) (Figure 2.13) is quite peculiar, and once again quite incoherent. The sector of the vestibule where most documents were found is on the floor near its northeast corner, and on the low benches in the northwest corner, near the entrance to the Great Archive, which was surely one of the places used for writing tablets, as proved by the fact that some fragments of bone styluses and a stone eraser were also collected there.

Summing up, on the basis of what has thus far been brought to light of the large and monumental complex of buildings constituting the high Early Syrian Royal Palace G of Ebla, some considerations about the functions of the individual sectors can be made. In the first place, the Central Complex, by far the largest in the palace, certainly had three main functions, albeit other minor functions cannot be excluded. Certainly its primary function was of serving as a residence for the king, queen, princes, princesses, and, quite likely, at least some of the highest officials; in its peripheral regions, precisely as a consequence of its main residential nature, lesser wings probably hosted handicraft activities, like food preparation (West Unit) (Figure 2.14), and were used as storerooms for food and vessels (South Unit). Under one of these sectors, the West Unit, a royal hypogeum (Hypogeum G4) was excavated, quite likely during Ishar-Damu's reign at the end of EB IVA, in order to host deceased kings and members of the royal family.

In the second place, the function of some small sectors, sometimes not easily accessible yet, remains doubtful, some hypotheses can be advanced. The first case is the northwest wing, midway on the west slope of the Acropolis, north of the Court of Audience: it was probably accessed through the small space in front of the Red Temple, on the west edge of the Acropolis, and included two rooms only, where the first forty-two tablets of the Royal Archives (L.2585) and the remains of precious wood furniture (L.2601) were found in 1974 (Matthiae 1992; 1995a, 105–11, plates 37–43; Dolce 2006). One possibility is that the northwest wing was a high official's residency.

The second case is the Southern Quarter, southeast of the Throne Room, probably opening into the Lower Town, where a few tablets were also found on the floor. In this case too, this could have been the residency of a high official, dealing with administrative matters. The third case is quite different and much clearer in terms of access and function: two rooms (L.2834 and L.2890) opened into the north side of the Monumental Stairway, and undoubtedly were the kitchens of the Court

of Audience and Administrative Quarter, as they featured several quite well-preserved fireplaces against the north wall of L.2890 (Figure 2.15). On the other hand, the kitchens for the palace residents were probably located in far away sectors of the Central Complex.

In the third place, as already maintained, the Court of Audience with the Administrative Quarter were the topographical and architectural government core. They were the political and economic focus of the town, where all the relations among the king and his officials with government functions (Figure 2.16), and among the employees, priests, craftsmen, messengers, and merchants of Ebla and their counterparts from other towns and other countries, took place. As far as we can judge, the Court of Audience and the Throne Room did not have different functions, but the Court could, of course, accommodate a larger number of persons and in a more public way, while the Throne Room was clearly a much more reserved place (Figure 2.17), besides being protected from the weather. We also mentioned before the analogies in the placement of the Northern Quarter and of the South Annex with regard to the royal throne.

Yet, some final considerations can be made about these two basic sectors with complementary functions, the Court of Audience and the Throne Room. These observations deal with the different size and articulation of the two sectors, and with the findings they yielded. With regard to the size, the Northern Quarter included a narrow corridor (L.9328 + L.2716 and L. 2617), two large rooms to the east (L.9583 and L.9330), and at least one more room, even larger, to the west (L.9593), not well preserved, and thus difficult to identify as either a room or a court. On the other hand, in the Northern Quarter, several medium-sized sealed jars were found (Figure 2.18), as well as wood caskets, also sealed, besides a large number of beakers, certainly used during the jammed receptions in the Court of Audience; in the two rooms of the South Annex there was the largest concentration of raw lapis lazuli of the whole Administrative Quarter (Pinnock 1986a; 1986b; 1987; 2006), besides remains of miniature

statues of precious materials (Plate 5:2), probably belonging to ceremonial standards (Pinnock in press), of the same kind as one found in one room of the Northern Quarter (Matthiae 2009a).

On the basis of these considerations, it seems possible to infer that the South Annex, connected to the Throne Room, may have been the treasure of the palace where extremely precious materials were preserved, like lapis lazuli, and some not less precious royal standards. By contrast the Northern Quarter, connected to the Court of Audience and not with the Throne Room, had a more differentiated function: it was certainly a storeroom for different materials, kept in jars and caskets and sealed by high officials, but it also had larger spaces where ceremonial objects, like a queen's standard (Plate 6), were kept, but which for their size might also have been used as offices for officials closely related with activities taking place in the Court of Audience.

Lastly, the question of the rooms or quarters used as offices for the administrative personnel is an unsolved problem in the interpretation of the functions of the different sectors of Royal Palace G, because no sure hint can be found about uses of this kind. Three hypotheses may be tentatively proposed. The so-called Trapezoidal Archive (L.2764) might have been used as an administrative office alone or with other functions too, because, unlike the Great Archive (L.2769) and the Small Archive (L.2712), it did not have shelves suitable for the final or temporary storage of tablets. One or more large rooms of the Northern Quarter, closely connected with the activities taking place in the Court of Audience (Figure 2.19), might also have had such function, but it seems less likely; the same could be said of a room, now lost of course, at the upper story of the Administrative Quarter and over the Trapezoidal Archive, possibly used for administrative activities taking place in the Throne Room. As concerns the Trapezoidal Archive and the potential room at the second story, it is quite likely that the administrative offices were at least in part devoted to administrative aspects related to the productions of the Eblaite *chora*.

NOTES

- 1 One text is a registration of the delivery of several jars of wine; the second tablet reports deliveries of large

amounts of goods, among which, in more than one instance, several types of wood; the third text deals with large agricultural lands and several cattle heads, sheep, and bovines (Archi 1993b).



Figure 2.1. Ebla, Area G, the Monumental Stairway of Royal Palace G, from the west, EB IVA, ca. 2400–2300 B.C.

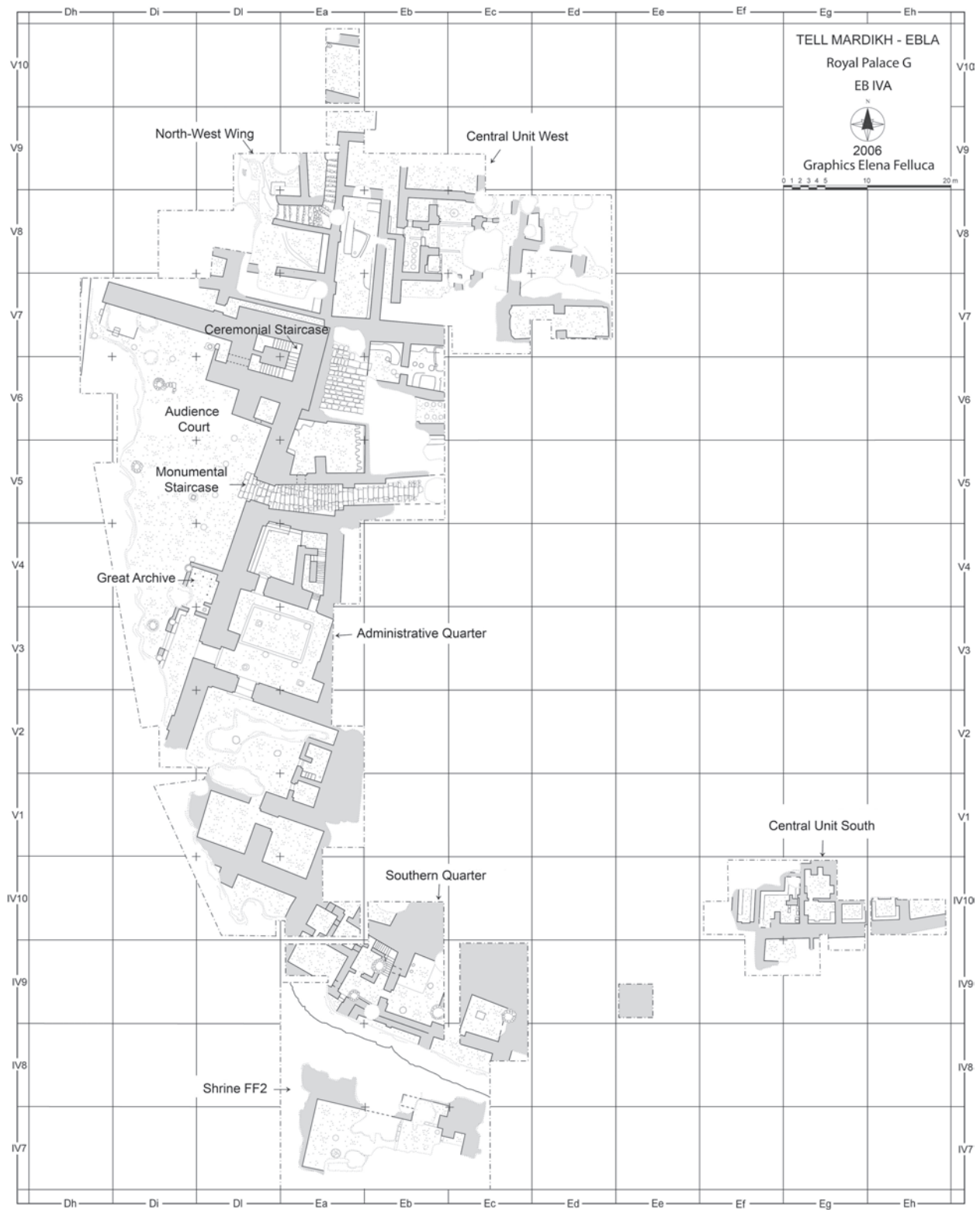


Figure 2.2. Ebla, general plan of Royal Palace G, EB IVA, ca. 2400–2300 B.C.

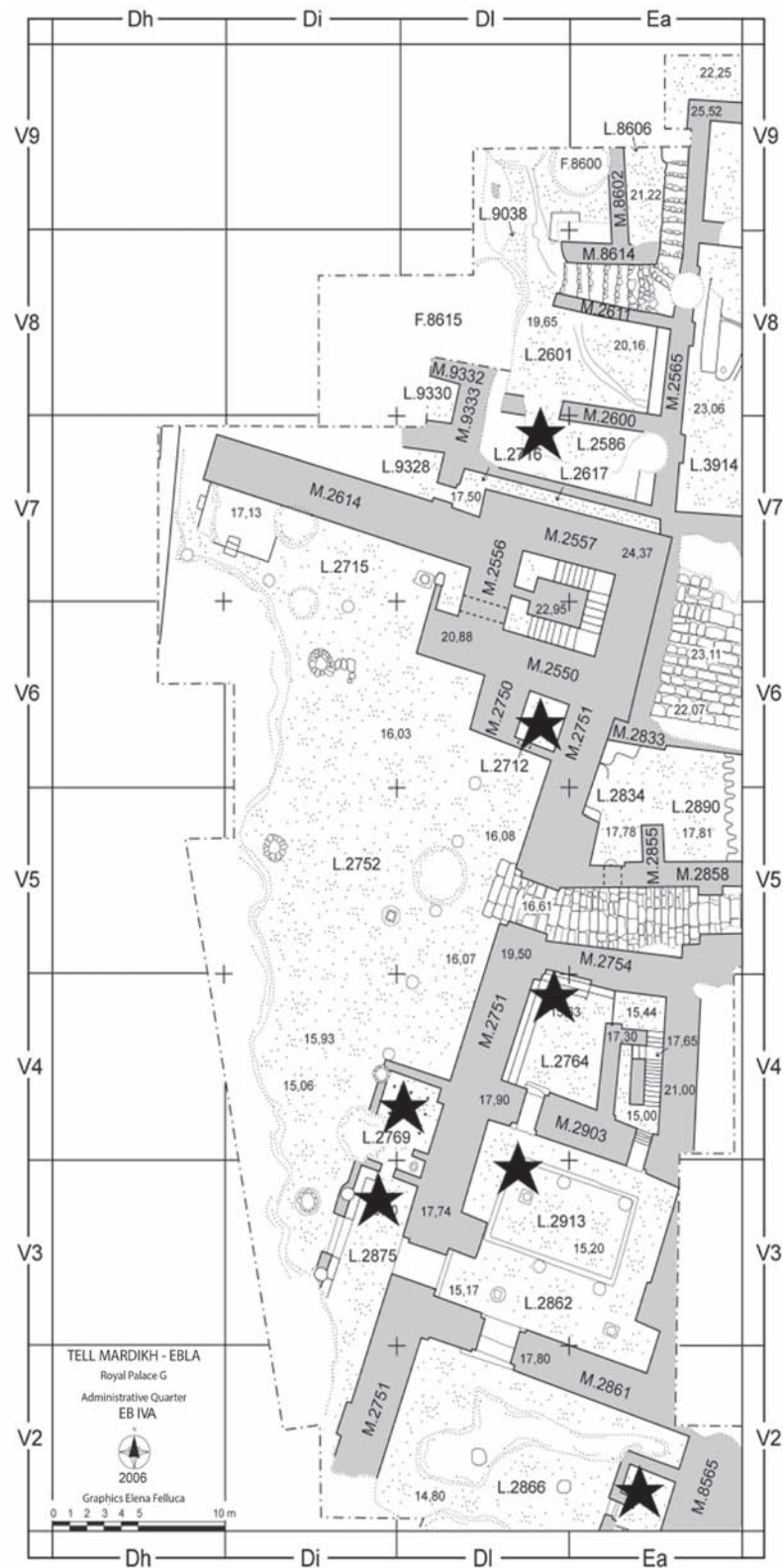


Figure 2.7. Ebla, Royal Palace G, plan of the Administrative Quarter and Court of Audience, EB IVA, ca. 2400–2300 B.C. The asterisk marks the findspot of tablets.



Figure 2.8. Ebla, Royal Palace G, royal podium in the Court of Audience, from the east, EB IVA, ca. 2400–2300 B.C.



Figure 2.9. Ebla, Royal Palace G, South Annex to the throne room L.2984 in the Administrative Quarter, from the south-east, EB IVA, ca. 2400–2300 B.C.



Figure 2.10. Ebla, Royal Palace G, tablets in place along the northern and eastern walls of the Great Archive L.2769 in the Administrative Quarter, from the south-west, EB IVA, ca. 2300 B.C.



Figure 2.11. Ebla, Royal Palace G, Great Archive L.2769 in the Administrative Quarter, from the south-west, EB IVA, ca. 2300 B.C.

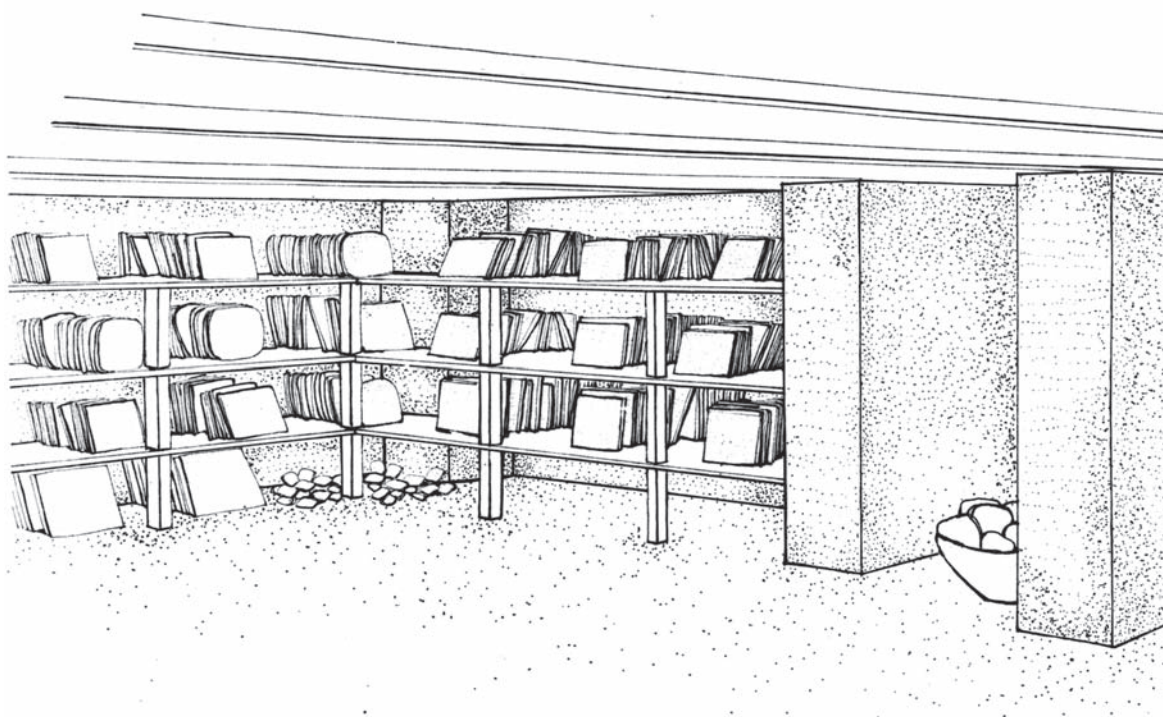


Figure 2.12. Ebla, Royal Palace G, reconstruction of Great Archive Room, L.2769, EB IVA, ca. 2300 B.C.

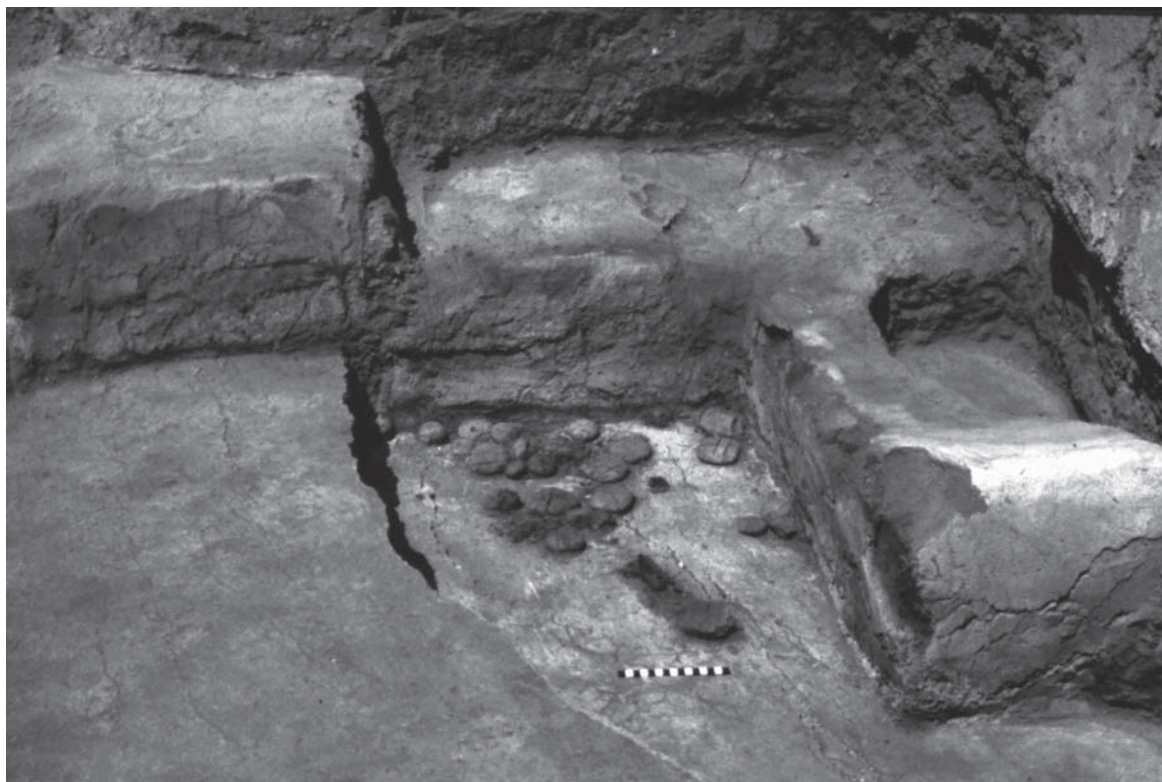


Figure 2.13. Ebla, Royal Palace G, in the north-west corner benches in vestibule L.2875, from the east, with some tablets in place on the floor, EB IVA, ca. 2300 B.C.



Figure 2.14. Ebla, Royal Palace G, benches with grinding stones and pestles for food preparation in situ in L.3926, from the west, EB IVA, ca. 2400–2300 B.C.

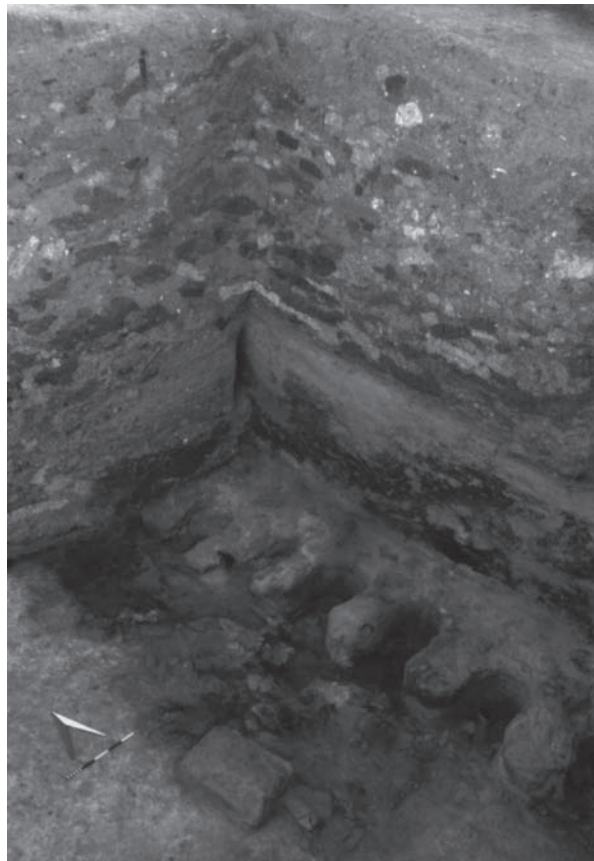


Figure 2.15. Ebla, Royal Palace G, fireplaces against the north wall of L.2890, from the south-west, EB IVA, ca. 2400–2300 B.C.

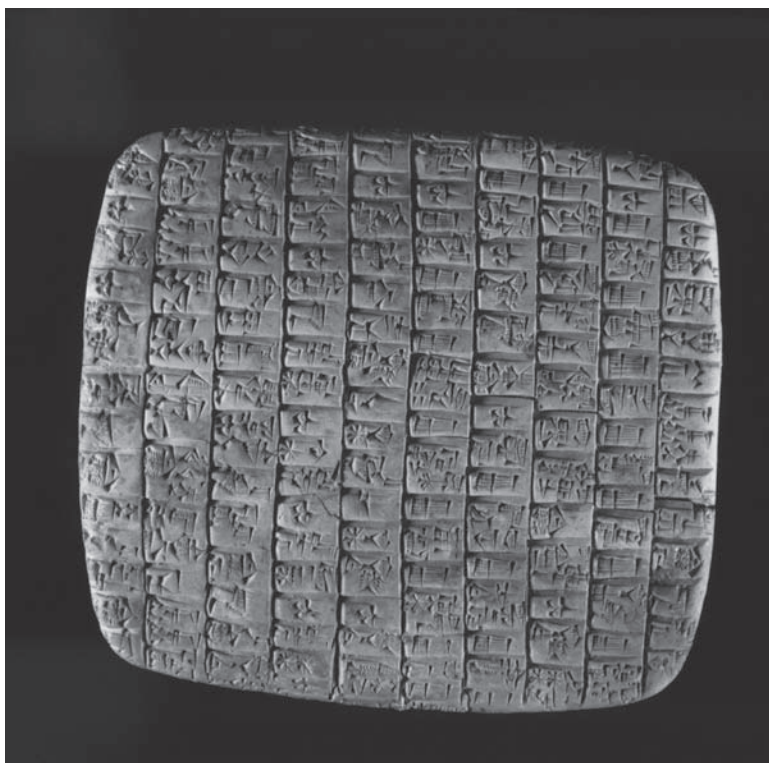


Figure 2.16. Ebla, administrative tablet with royal orders concerning Ibrum family's properties, TM.75.G.1444, EB IVA, ca. 2300 B.C.



Figure 2.17. Ebla, tablet with the text of the treaty between Ebla and Abarsal, TM.75.G.2420, from the Great Archive L.2769, EB IVA, ca. 2300 B.C.

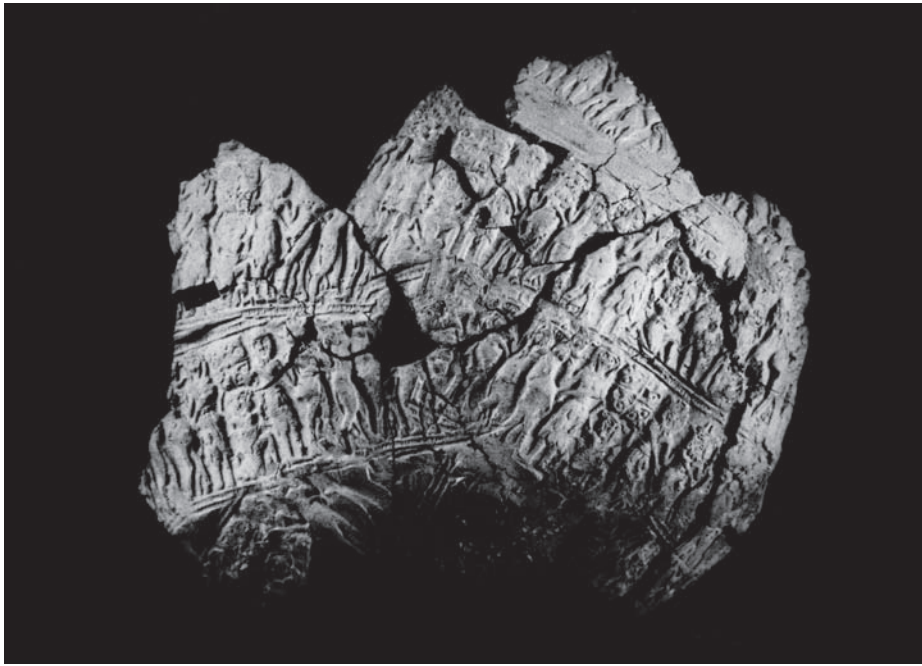


Figure 2.18. Ebla, Royal Palace G, clay *bullā* with cylinder seal impressions, TM.75.G.588, EB IVA, ca. 2300 B.C.



Figure 2.19. Ebla, economic tablet recording assignments of gold and silver by Ibbi-Zikir, TM.75.G.1998, EB IVA, ca. 2300 B.C.

CHAPTER 3

PALACE VS COMMON GLYPTIC IN EARLY SYRIAN EBLA AND ITS TERRITORY

F. Pinnock

The systematic exploration of the town of Ebla of the Early Bronze IVA period (Mardikh IIB1, ca. 2400–2300 B.C.) started in 1973, with the identification of the top of a corner tower of the building later on identified as Royal Palace G. Thus far, the buildings of this period brought to light include large sectors of Royal Palace, two cult areas, and one building in the Lower Town north. Royal Palace G probably stretched over the whole acropolis, but only some peripheral sectors have been excavated so far, laying on the east and south slopes of the Citadel and at the foot of the south area of the acropolis. As regards their functions, these wings, albeit not the central part of the palace, represented the directional and ceremonial centres of the palatial complex, including the Administrative Quarter, the Throne Room with its annexes, the Court of Audience, and parts of the residential and services wings.¹ The two temples, the Temple of the Rock and the Red Temple, were respectively located in the Lower Town east and on the northwest edge of the acropolis (Matthiae 2007; 2009c; 2009d). The last known building of the mature Early Syrian period, called Building P4, is located in the Lower Town north, and was prevalently devoted to food transformation and handicraft productions (Marchetti and Nigro 1995–96).

Among all these buildings only Royal Palace G yielded a large number of seals from different kinds of containers, including seal impressions on *bullae* and seals impressed before firing on preservation and cooking jars. The impressions directly made on jars belong to seals in a linear-

cursory style, while the *bullae* follow a well-defined court style.

The impressions on jars found thus far are approximately fifty. The figurative repertoires mainly include geometric and floral motifs and scenes with animals and human characters, like the woman with spread legs, certainly hinting at fertility. This class is not limited to the Eblaite evidence, as it is well known, and is documented by several specimens from EB III to EB IVB (Mazzoni 1992; 1993). In her study about these impressions, Mazzoni underlines a quite clear division between geometric and floral motifs on the one hand, mainly attested in jars of the corrugated type, used for storage and found in the working sections of the palace, and the iconographies prevalently relating to fertility themes on the other, which were almost exclusively used on ovoid jars, frequently featuring three feet and found in the official sectors of the palace (Figures 3.1–2).² As concerns the impressed jars themselves, they belong to common typologies of preservation and kitchen wares, in particular the pattern-combed jars, usually believed to contain oil, and the ovoid jars with three feet, made with a typical pseudometallic ware; the latter, with a few exceptions,³ were never used for cooking, but rather for preservation and food transformation.⁴

The *bullae* bearing the impressions of the palace's official seals are more than two hundred, and several of them are quite well preserved, so that it is possible to examine their back surface. In the first analysis, eleven kinds of *bullae* were

identified, based on the type of stopper used and the probable type of container on which the *bulla* was placed. Two types only, both cap-shaped, belong to jar stoppers: one was placed directly on the jar mouth (Figure 3.3), while the other was used to seal a second cap, used as jar stopper. All the other *bullae* sealed different kinds of containers and were placed directly on their openings or on studs, holding ropes: on the basis of the traces left on the back of the *bullae*, wooden boxes and caskets were identified (Figure 3.4), and in one instance also a wickerwork basket (Figure 3.5). The traces found include slight grooves left by the contact with wood in *bullae* often featuring a right-angle profile, as they had covered the lid and part of the side of the container; deeper grooves were produced by the contact with wicker, ropes, and strings; and straight, rather deep hollows marked the presence of studs, sometimes also bearing marks of strings, belonging to stoppers placed in straight or oblique position (Figure 3.6), quite likely in holes piercing the lids and sides of the containers. The original seals identified from all the preserved impressions are fifteen or sixteen;⁵ thus all the seals had been used more than once, to seal several containers or to reseal containers which had been opened and closed again.⁶

With respect to the iconographies characterizing this repertory, they certainly derive from those most commonly attested in Early Dynastic Mesopotamia, but with some important differences: for instance, the most frequent theme is the so-called contest scene, while the banquet scene is totally missing.⁷ The seals always feature one register only, and in two specimens the figurative field is limited, at the top and the bottom, by friezes of human and animal heads (Figure 3.7), according a peculiarly local tradition (Amiet 1985, 477). Another trait strongly marking the Eblaite palace glyptic style is the constant presence of human and divine figures actively taking part in struggles among animals (Figure 3.8). In fact, the traditional fighting group includes a lion and some animals representing the benign aspects of nature, mainly bulls and deer, facing each other in the classical crossed scheme or simply standing one in front

of the other, with the lion biting the other animal at the throat; but in the Ebla seals, frequently a divine figure, two human characters, and a bull-man, in different combinations, help the attacked animals. The divine figure is a goddess featuring cow horns and ears, or only cow ears, who wears a recognizable attire with marked oblique flounces and rounded at the edges that by no means can be interpreted as a *kaunakés*. She is represented as mistress of the lions (Figure 3.7), which she holds by the back paws, with their heads downturned; or as patron of the bulls or deer, standing at their side and holding them by one forepaw; or as a companion of the bull-man, with whom she apparently holds hands. This deity was recently identified with Ishkhara, a very important deity of the Eblaite pantheon with a special relation to the king and queen, who has as symbolic animal the scorpion, also represented on the palace glyptic.⁸ The two human figures are a man and a woman, often identified with the king and queen of Ebla.⁹ The two characters cooperate with Ishkhara in defending bulls and deer, but they can also act alone. Among the distinctive elements of this Eblaite glyptic produced in the royal workshops, we may also remember Atlas—a kneeling hero with curly locks framing his face (Figure 3.9), carrying a four-part symbol with four heads,¹⁰ probably two human and two animal heads—and a high rectangular chapel featuring at the bottom a figure now erased, possibly of a bull-man, over which the four-part symbol appears surmounted by two human heads, possibly male and female (Figure 3.10). The largest number of *bullae* was found in the Administrative Quarter, precisely in the Trapezoidal Archive (L.2764), in the Great Archive (L.2769), and in the inner courtyard of the same Quarter. Other groups of seals were also found in the two long stores located behind the north façade of the Court of Audience, where also the largest number of jars bearing the impressions of the seals in the linear-cursory style was found.

Another piece of evidence to take into account is the fact that some seals also featured an inscription bearing the owner's name, and it was thus possible to ascribe a number of seals to two high officials. On the basis of these inscriptions

and of the textual evidence, it was proposed that the two officials, Ibdula and Rei-Naim, were the same as the characters mentioned in the texts—the first one as *ugula*, charged with the control of agricultural production, and the second one as supervisor of the working units and of the delivery of food rations (Micale and Nadali 2010, 15). Apparently Ibdula used one seal, characterized by the presence of the double frieze of heads, only to seal containers of administrative documents and goods delivered to the palace and stored in the Administrative Quarter, while he used two different seals for other kinds of operations, both in connection with the two long stores behind the Court of Audience. He also verified operations already validated by other officials (*ibidem*, 21). Thus far, three different seals, used for several *bullae*, can be ascribed to Ibdula: in two of them the goddess Ishkhara is depicted, while one seal, as already mentioned, features the double frieze of heads at the top and the bottom. Rei-Naim is the owner of a seal with a more “classical” pattern, where the goddess Ishkhara is at the center of a group including a lion and a bull, whereas at the sides of the group the king and the queen appear; one peculiar detail is the presence of a big bullman’s head, over which the inscription is located.

Generally speaking, it may be maintained that the seals of the central administration officials represent a production of the great palace workshops, which created a well-characterized and peculiar repertory whose circulation was limited to the central administration itself. At a first analysis it seems possible to identify different uses according to the different operations taking place in the Administrative Quarter, though this analysis must be limited at the moment to the seals with inscriptions. It seems anyhow certain that the high officials checked and validated by means of their seals the operations that took place inside the palace as well as the acts of other officials; and, based on what can be inferred for Ibdula and Rei-Naim, apparently this did not create a relation of direct subordination between them, since, according to the written evidence, the two officials had a similar level. At the moment it is not possible to explain the evidence offered by the only real cylinder seal found in the palace,

in the rooms of the north-east quarter, behind the Court of Audience: the seal carries the inscription of the official Ushra-Samu, probably the character mentioned in the administrative texts as *ugula* and charged with the control over the women’s sectors of the palace.¹¹ On the one hand, the context in which the seal was found seems to confirm the official’s role, as the quarter was quite likely occupied by high-rank ladies, as can be inferred from the finding in the same place of the *maliktum*’s standard (Matthiae 2010d). On the other hand, it is possible to suppose that the official had received his charge shortly before, and therefore did not have the time to use his seal. This hypothesis contrasts, however, with the textual evidence, so it seems more likely that the seal was used for goods which were not placed in the Administrative Quarter but rather in the inner sections of the palace, where the ladies really dwelled. In fact, according to one hypothesis, the rooms where the seal and the Standard were found were not the customary residence of the ladies, but rather they were used for the ceremonies held in the Court of Audience.¹²

On the basis of the evidence found thus far in Ebla and in several great centers of northern, coastal, and inner Syria, it is possible to maintain that each center produced official glyptic repertoires, which, though inspired by the great productions of southern Mesopotamia, featured easily recognizable stylistic and thematic peculiarities, and which were used by high officials exclusively within the central administration.

On the other hand, the production in the linear-cursory style, as already maintained, belongs more generally to a repertoire found, with quite similar specimens, in northern inner and coastal Syria and in southern Anatolia, while different practices that only share the technique of impressing the seals before cooking and the iconographies adopted, but seem to refer to quite different customs and to a more local distribution, are attested in northern Mesopotamia and in the southern Levant (Joffe 2001, 359–64). Within this class, a bone cylinder seal was found in Ebla with iconographic motifs somehow related to both the linear-cursory and the court style

(Figure 3.11), of which no impression has been found thus far (Mazzoni 1992, 8, plate XLIII).

Thus, it seems quite likely that the palace officials were charged with controlling the centralization and redistribution of agricultural and breeding products and at least part of the storage of precious goods, which were kept in caskets and boxes inside the Administrative Quarter. It is also possible that they had to verify the movements of the same goods inside the palace, possibly due to their frequent substitution, as suggested by the large number of *bullae* found and by the presence of sealed *bullae* placed on other *bullae* sealed by other officials. The jars sealed before firing, on the other hand, pose some problem of interpretation.¹⁴ The only certainty seems to be that they pertained to administrative practices taking place outside the center of power, and that the seals, with their simple themes featuring geometric and floral designs and scenes related to fertility, belonged to peripheral officials working directly in the villages or farms where production took place. The most likely hypothesis is that the jars were marked in order to signal that their contents were of a special nature or came from a particular farm: in any case, it is most probable that the primary products for this practice were wine and oil. Thus, the seals in the linear-cursory style point to a decentralization of power in the territory controlled by the town, while the problem of the dislocation range of the jars still has to be cleared up: in fact, in upper Syria and upper Mesopotamia they apparently had a strictly local circulation, while the seals of the Eblaite jars point to a larger diffusion, probably hinting also at forms of trade among centers not close to one another. They have certainly to be related to the process of centralization and redistribution of food production and to its successive transformation for the internal use of the central administration, with forms of decentralized control in the territory and crossed checks inside the palace. Yet, we also have to register the circulation of these containers inside the palace, apparently without further controls, as is demonstrated by the presence of five jars with seal impressions, together with other without impressions, in the court kitchens near the Monumental Stairway

opening into the Court of Audience, where no *bullae* with court seal impression was found. This type of double control seems to be a peculiarity of northern inner Syria, and is likely related to the large extension of territory directly controlled by towns like Ebla and to a more articulated structure of local societies, whereby peripheral officials probably had some autonomy in the organization of their work and were allowed to possess cylinder seals, whose iconographies referred to concepts connected to, but quite different from, the official ones elaborated by the palace workshops.

NOTES

- 1 For a description of these wings of Royal Palace G, see Matthiae (2008a, 27–61; 2010b, 65–117).
- 2 See Mazzoni (1992, 65–66). For the distribution and use of the jars inside Royal Palace G see also the contribution by D’Andrea and Vacca in this volume.
- 3 In a kitchen connected to the Court of Audience, one impression was found on the rim of a corrugated jar; since only a small section of the rim was preserved, it could not be ascertained if the jar was used for cooking, as it was found far from the fireplaces. Four more impressed jars were found in situ on the fireplaces. See Mazzoni (1992, 71, 76–77, plates X, XIII, XVIII–XX, XXIII, nos. A18, 41–44).
- 4 With regard to an interesting hypothesis recently proposed (Graff 2012), suggesting that the seals were used to identify the cooked products contained in the jars, it may be recalled that in Ebla, though several jars featured the typical kitchen ware, only four specimens were found in situ, on fireplaces, in a kitchen adjacent to the Monumental Stairway and opening into the east façade of the Court of Audience. This room was certainly used to prepare food, but most probably also drinks to be served in the Court itself (Matthiae 2008a, 45). It is therefore possible that the seal was used in order to identify at a first glance the jar content, but this interpretation cannot be held true for the whole evidence, though it can certainly be related to the hypothesis, already advanced by Mazzoni (1992, 193–94), that the seal was used to identify a product coming from a particular farm or of a special quality.
- 5 One impression was very fragmentary and preserved only traces of figures, which could not be related to other known seals.

- 6 The Early Syrian impressions from Ebla were never presented in a systematic way; however, a description of the figurative motifs and considerations about their meaning were presented by Matthiae (2008a, 127–29; 2010b, 172–78). The same author has been preparing a detailed study of this important class of materials and I wish to express here my deep gratitude to Matthiae, who allowed me to access the detailed files he had prepared and who has charged me with the final publication of the courtly-style seal impressions from Royal Palace G, which will appear in a forthcoming volume of *Materiali e Studi Archeologici di Ebla*.
- 7 In this sense the Eblaite production seems more locally characterized when compared with the glyptic from other contemporary great centers, and with a more limited distribution area: at Mari, for instance, the imprint is more definitely a Mesopotamian one, with only some elements ascribable to a local tradition or to a Hurrian substrate (Amiet 1985). At Tell Beydar and Tell Brak a marked local style was identified, characterized by chariot scenes with different meanings, but with a larger distribution at the regional level (Jans and Bretschneider 1998; Teissier 1997; Rova 2008), and with some elements of strong south Mesopotamian derivation (Marchetti 1998).
- 8 Matthiae (2010d, 284). For this divine figure in the Eblaite Pantheon, see Pomponio and Xella (1997, 202–17).
- 9 It seems quite likely that these two figures do not represent specific kings and queens, eventually owners of the seals, but are rather meant to be a mythical-symbolic depiction of kingship, embodied by the two persons helping the goddess in protecting nature. See Matthiae (2008a, 128; 2010b, 216–17) and Pinnock (2008).
- 10 As proposed by Matthiae (1989a, 337–38), this symbol should hint at the general idea of a division of the world in four parts, possibly also reflected in the probable division of the urban pattern of Early Syrian Ebla in four parts, a division pivoting on the four streets starting with the four city gates. The same author proposed that this ideology of cosmos might have inspired Naram-Sin, who was the first Mesopotamian sovereign to adopt the title of “king of the four parts of the world,” which later became usual for Mesopotamian kings.
- 11 See Matthiae (2010d). The figurative pattern is similar to that of Rei-Naim’s seal, with Ishkhara dominating two lions, held by the back paws and downturned, flanked by the king and queen; a second group of figures features the bull-man holding a lion, which attacks a deer. In this cylinder the inscription is carved at the top, in the band of heads, which limits the field.
- 12 See Pinnock (2012). The hypothesis is that the court ladies, and most probably the queen herself, used the rooms behind the Court of Audience before reaching the king during the ceremonies which took place in the large open space outside Royal Palace proper, and that the officials taking part in the ceremony, as well as the court ladies, held standards or were accompanied by servants holding standards.
- 13 For some considerations about the modes of trade in Early Syrian Ebla see Pinnock (1984; 1985a; 1985b; 1986a; 1988; 1991) and Peyronel (2006b).
- 14 For different proposals of interpretation of this practice see Mazzoni (1992, 190–96).

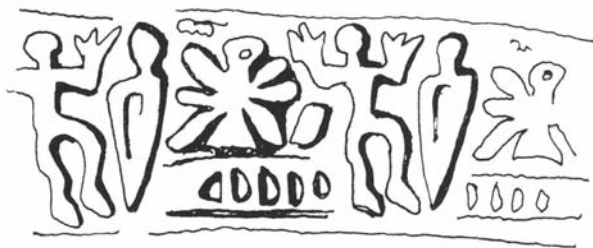


Figure 3.1. Drawing of a seal impression on jar TM.75.G.280/22 (after Mazzoni 1992, no. A16, plate VI).

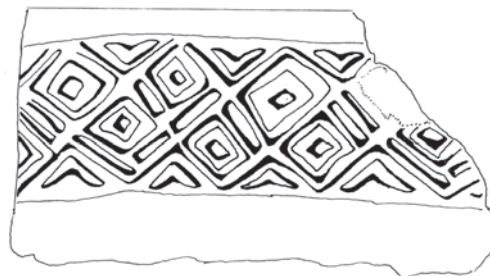


Figure 3.2. Drawing of a seal impression on jar TM.69.G.128 (after Mazzoni 1992, no. A6, plate IV).

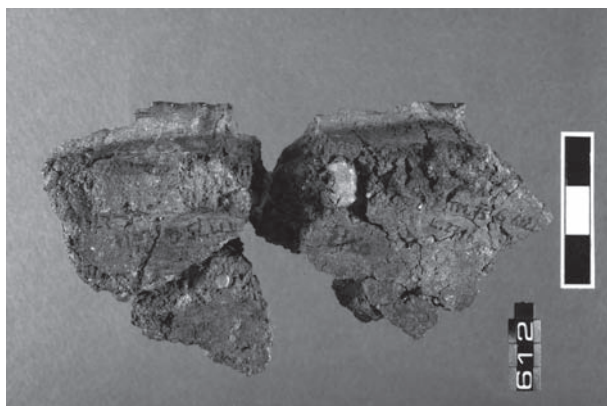


Figure 3.3. Back side of *bulla* TM.75.G.612 with marks of the jar rim on which it was applied.

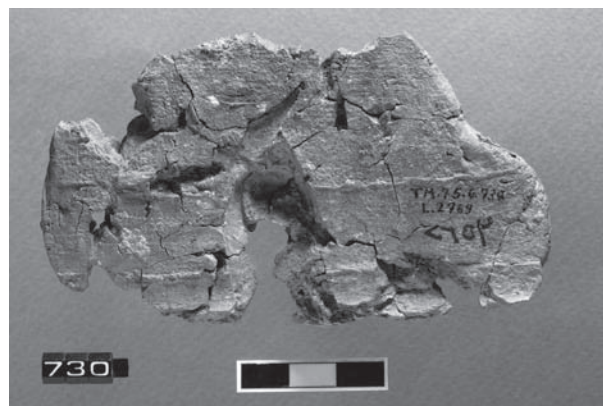


Figure 3.4. Back side of *bulla* TM.75.G.730+732, bearing marks of a wooden box, on which it was applied.

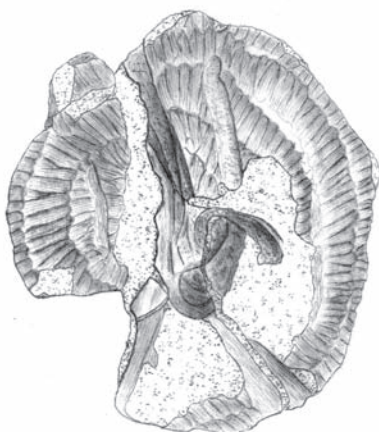


Figure 3.5. Drawing of the back side of *bulla* TM.75.G.827+842, bearing marks of a wickerwork basket.

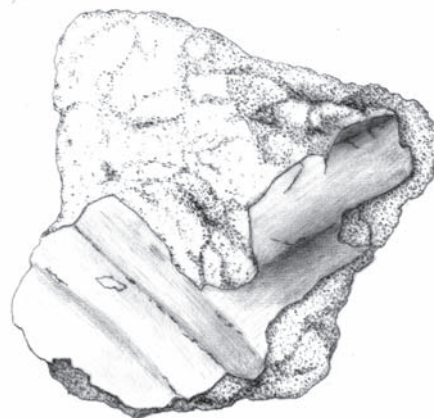


Figure 3.6. Drawing of the back side of *bulla* TM.75.G.585, bearing marks of deep oblique grooves.



Figure 3.7. TM.07.G.200: Ushra-Samu's seal.



Figure 3.8. Reconstruction of a "palace style" cylinder seal from several *bullae*.



Figure 3.9. Reconstruction of a "palace style" cylinder seal from several *bullae*.



Figure 3.10. Reconstruction of a "palace style" cylinder seal from several *bullae*.



Figure 3.11. Bone cylinder seal, TM.75.G.729 (after Mazzoni 1992, plate XLIII, 8).

CHAPTER 4

POPULAR ICONOGRAPHIES IN A COURTLY ENVIRONMENT

Clay Figurines from Royal Palace G and the Coroplastic of Inner Syria during EB IVA

L. Peyronel

1. INTRODUCTION

Terracotta figurines dated to the Early Bronze Age IVA-B (ca. 2500/2400–2000 B.C.) from inner Syria show common typological features that identify a different regional production from those attested in the Euphrates and Khabur valleys, coastal Syria and Lebanon, and southeastern Anatolia (Peyronel 2008b; in press b).¹ The precise geographical area of this coroplastic “province” is however still difficult to define, since only Ebla and Hama have given a consistent number of specimens from primary contexts, whereas in most of the sites only few figurines have been published or noticed.

That Ebla was the main manufacturing regional centre seems to be demonstrated by the main types and classes of anthropomorphic and zoomorphic figurines attested, which show homogenous iconographic and technological traits that appeared fully developed immediately after the mid-third millennium B.C. and exhibited a strong continuity during more than four centuries, as revealed by the stratified materials at the site.²

Badre (1980; see also 1995) was the first to try to define the main types of central and northern inner Syrian anthropomorphic clay figurines from the Bronze Age, although the identification of chronological reliable groups suffered from the limited documentation available at that time and was based mainly on the Hama materials.³

However, Badre correctly dated to the EBA some types that can be considered peculiar of what she called the “Orontes” region and that are predominant in Hama J (Badre 1980, 52–54, 136). In particular, the type with expanded rounded torso, column-shaped legs, applied forearms, with or without chests, and sometimes with crossed lines has been identified as the peculiar type of the middle Orontes valley (ibidem, type MA III1, 2).

After Badre’s study several important assemblages dating from the EB IVA-B periods and coming from settlements located in the Euphrates valley or in the Jezirah have been published, which allow to build up a detailed typology of the anthropomorphic figurines.⁴ On the contrary, only few specimens enlarged the corpus from northwestern Syria, preventing a better definition of the regional characteristics; beside Ebla, it is Hama that still represents a key site to investigate the development of terracotta production during the EBA.

A consistent number of figurines come from Hama J8–1 and other pieces can be dated to EB IV taking into account their typological features, since the assigned chronological phases are in most cases doubtful (see Marchetti 2001, 184–87). Badre includes in her work ca. fifty figurines retrieved in levels of phase J, but several of them are dated to the beginning of Middle Bronze I, as pointed out by Marchetti; on the contrary,

other figurines from later contexts or without secure provenance should be ascribed to EB IV.⁵

Therefore, only thirty-nine specimens (Badre 1980, nos. 1–2, 5, 9, 21, 41, 60–65, 67–82, 84, 86–87, 89, 95, 101–102, 108, 117, 120–121) can be assigned to the EB IVA-B periods, although a precise distinction between the two EB IV chronological phases based only on the attribution to Hama J sublevels is not reliable.

The EB IV Hama anthropomorphic figurines can be classified into few types, which find precise comparisons in the Eblaite corpus:

- a. Female figurines with torso characterized by rounded lateral expansions and forearms applied to the chests, with or without crossing strips/incisions, attested by nine specimens (Badre 1980, 53, 174–77, type MAIII 1, nos. 61–63, 66, 68–72, plates III–IV; see Fugmann 1958, figs. 64:3C689, 3C627 [J6], 74:3A742, 3C633, 3C611, 3C630 [J5], 85:3A648 [J4], 93:3A382 [J3]). This type can be associated with heads showing different hairstyles, such as short curls at the back (Badre 1980, nos. 62–63; see also Fugmann 1958, fig. 93:3A653), or a knob at the top of the head (Badre 1980, no. 61). This type seemed to be very common in Hama and it might be related to a local workshop, possibly influenced by the Euphrates types. Similar figurines have been found also in Ebla in contexts dating to EB IVA and EB IVB, and it cannot be excluded that they were imports from the Hama region (see *infra*);
- b. Female (?) figurines with torso characterized by rounded lateral expansions decorated by crossing incisions and no arms (only one specimen with preserved head with long curls); this kind of torso is very frequent in Ebla and might be considered peculiar of the northern part of inner Syria (eight specimens: see Badre 1980, 53, 179–80, type MA III 2, nos. 67, 79–85, plate IV; Fugmann 1958, fig. 64:3C594, 3C586, 3C707 [J6], 74:3C631, 3C632, 3C613 [J5],

85:3A586 [J4], 98:3A73 [J2], 103:3A62 [J1]).

- c. Male figurines with torso characterized by pointed lateral expansions with or without crossing incisions, and a head with conical top (Badre 1980, 54–55, 161–62, type MAIV 1a, nos. 1–2, 5). This type too finds comparisons in Ebla dated to EB IVA and IVB.
- d. Female figurines with expanded shoulders and modelled arms bent to the chest. This type is attested by some specimens that could be considered imports from the Euphrates region (Fugmann 1958, figs. 58:3E883 [J8], 63:3C707 [J6], 93:3A340 [J3]; Badre 1980, 79, type MAI 3b, 177–78, nos. 74–75, plate IV) and by other specimens, possibly local copies, characterized by torso with crossing decorated strips (*ibidem*, 178, nos. 76–78, plate IV).

Most of the Hama figurines seems to be dated to EB IVB (J 4-1) and some of them at the very end of the period, as testified by painted specimens (e.g., Badre 1980, no. 30) and by specimens related to a transitional EB IVB/MB I group (*ibidem*, no. 59; see also Marchetti 2001, 187, plate 233.1).

Some anthropomorphic figurines from Suran-Tell Masin (du Mesnil du Buisson 1935b, plate L, 80, 113–14; Badre 1980, 197–98, nos. 6–10, plate X) are dated to EB IV, attesting the diffusion of the type with expanded torso and applied forearms in the middle Orontes valley, which suggest the existence of a local regional workshop.

Some figurines (two anthropomorphic figurines and one quadruped) recently published from Tell es-Sur—a circular EB IV site located at the border of the steppe ca. 20 km southeast of Tell Mishrife-Qatna (al-Maqdissi and Ishaq 2012)—attest types known in Hama and also in Ebla, showing that the inner Syrian tradition reaches the steppe region to the east of the Orontes valley, as indicated also by unpublished materials from Al-Rawda (Castel, pers. comm.).

The specimens from sites located in northern inner Syria (Matkh and lower Quweiq valley, Jazr, northern Orontes valley, and the limestone plateau around Ebla) find strong comparisons with the Eblaite materials, and they are surely influenced by or directly manufactured in the Ebla workshops. However, most of the pieces probably date to EB IVB, and we have little information regarding the coroplastic contemporary to the period of Ebla's apogee.

At Tell Tuqan a consistent occupation dating to EB IVB is testified by surface materials and by soundings on the fortifications and in the Lower Town (see Baffi and Peyronel, in this volume). Only three specimens of anthropomorphic figurines have been retrieved, which attest to a production strongly resembling that from Ebla, but also to possible influences from the Euphrates valley.⁶

Similar evidence is represented by some figurines found at Tell Afis (Scandone Matthiae 1998, 386, 392–93, fig. 406: nos. 1–3; 2002, 16–17, fig. 8:1, 4–5), with pieces probably dating to EB IVB showing the influence of the Euphrates production.

The published EBA terracotta figurines from Tell Mastuma find precise parallels in Ebla; at this site we can also detect the presence of anthropomorphic figurines with expanded shoulders and arms applied to the breasts, probably dated to EB IVB (Nishiyama 2009, fig. 8.33:3–7, 9, 11).

The rock tomb with a multiple grave discovered near Saraqeb (Suleiman and Gritsenko 1986) yielded pottery materials mainly dating to the last phase of EB IVB, but also pieces belonging to MB IA. The only terracotta figurine included in the funerary assemblage, a female figurine with arms bent to the chest, can be dated to the very beginning of the second millennium B.C. (ibidem, 62, plate I:3; Marchetti 2007, 252).

In the northern Orontes valley some figurines from Tell Qarqur can be assigned to northern Syria coroplastic production,⁷ but some pieces show the coexistence of types influenced by the

eastern Euphrates workshops during EB IVB (Dornemann 2003, 95, 193, figs. 174–75, 193). Particularly interesting is an oversized female figurine with large shoulders and decorated strips applied on the neck, which has been retrieved in the destruction level of a cultic building in Area E together with a large amount of small finds (see Ascalone and D'Andrea, in this volume).

The production of the Amuq valley during EB IV (Phases I–J) is poorly documented.⁸ Two clay human figurines are assigned to Phase I (Braidwood and Braidwood 1960, 419–20, fig. 323:2–3, plate 50:5, 13): one has a head with conical top and two long lateral curls and it is clearly referable to the northern Syria tradition (Pruss 2010, 40 no. 19, plate 2:19), the other is without eyes and has a pinched nose and applied elements, seemingly linked to a local production (ibidem, 43 n42). Animal figurines are attested in Phases H and J with some quadrupeds, probably bovinds (ibidem, 419, figs. 323:1, 350:4, plate 51:8), very different from the animal figurines from EB IVA–B at Ebla, and possibly reminiscent of a EB III coastal tradition.

Thirty anthropomorphic figurines related to a coroplastic production circumscribed between EB IV and the beginning of the MBA have been published and discussed by Pruss (ibidem, 35–45, Frühe “Pfeilerfiguren”). They come from Tayinat, al-Judaïdah and Chatal Höyük, although it is not possible to trace a typological development on the base of their retrieval contexts.⁹ Pruss has grouped them identifying five different head types (ibidem, 37, FPF I–V, with sub-types) and three types of arm position (ibidem, FPF 1–3). A group of them, assigned to the Second Mixed Range by the excavators (Braidwood and Braidwood 1960, 466–70, figs. 368–70, plate 50; Pruss 2010, 37–38, 41–42, nos. 2, 5, 20, 23, 28), are examples of the local coroplastic at the end of the third millennium B.C. The combination of different traits and features is apparent in a head with applied eyes, prominent nose, and an elaborate hairstyle with lateral curls and a thick bun decorated with small circles at the back of the neck (Braidwood and Braidwood 1960, fig. 368:2; Pruss 2010, 37 no.

2); a figurine with applied elements on the neck and the back, painted crossed bands on the torso, open arms with bracelets indicated by applied strips, and a head with lateral pellets, pinched nose, and “coffee-bean” eyes (Braidwood and Braidwood 1960, fig. 368:5, plate 50:6; Pruss 2010, 38 no. 5); and a female figurine missing the head with column-shaped legs, open short arms, breasts indicated by pellets, and a long vertical strip applied to the back (Braidwood and Braidwood 1960, fig. 370, plate 50:10; Pruss 2010, 41 no. 20, plate 2:20). The type (painted or unpainted) with open short arms decorated by bracelets seems to be the most attested one in the Amuq at the turn of the third millennium B.C. (Pruss 2010, nos. 1, 5–6, 20–21). Despite the presence of some visual elements also in the Eblaite figurines, it is difficult to include these items into the coroplastic tradition of northern inner Syria.¹⁰ Finally, another specimen with expanded shoulders, plain torso, and decorated strips on the neck indicating necklaces is probably an import from the Euphrates valley (Braidwood and Braidwood 1960, fig. 368:4; Pruss 2010: 42 no. 28, plate 3:28).

Summing up, the Amuq material seems to indicate the presence of figurines that find parallels in Ebla and Hama together with others that can be assigned to a different local production, although its typological peculiarity and its chronological development cannot be defined on the basis of the evidence. The selective publication of the small finds of the “Syro-Hittite” Expedition of the Chicago Oriental Institute and the number of not well stratified findings, without context or assigned to phases later than the third millennium B.C., make the evaluation of the EBA coroplastic of the Amuq valley very difficult, and as a consequence, also the investigation of the coastal levantine terracotta production is problematic.

The inner Syria coroplastic province does not reach to the Jabbul region to the east, since all the EB IVA-B material from Umm el-Marra can be ascribed to the Euphrates production (Petty 2006). It seems therefore that coroplastic and ceramic provinces are not coincident, with a

wider geographical diffusion of the caliciform pottery tradition (see Mazzoni, in this volume, and Mazzoni 1985b; 2002a). In spite of the still limited pattern of geographical distribution of terracotta figurines in inner Syria, it is possible to identify an uninterrupted local tradition of anthropomorphic and animal clay figurines from the mid-third millennium B.C. until the end of the late Early Syrian period. This tradition seems to be diffused in central and northern inner Syria and it is characterized by homogeneous and long-lasting types of figurines, well distinct from those attested in the eastern region of the Euphrates and Khabur valleys. Ebla and Hama were without doubt two important centres of production of this coroplastic province, which includes the Orontes valley to the west and southwest and reaches the Amuq plain to the northwest, overlapping with a local coastal tradition that cannot be precisely defined on the basis of the few material published. Anthropomorphic figurines from Ebla, Tuqan, Afis, Mastuma, Qarqur, and Hama attest an increasing influence of the eastern production during EB IVB, when specimens are imported from the Euphrates valley together with pieces imitating the eastern types. However, the regional data are still too scanty to draw a precise evaluation of the area of diffusion and to distinguish between subregional traditions.

2. THE EBLA CORPUS: EARLY BRONZE IVA AND IVB

Slightly more than 700 clay figurines from Ebla can be dated to the second half of the third millennium B.C.¹¹ They have been found in primary and secondary contexts dating from EB IVA (Classic Early Syrian Period, ca. 2400–2300 B.C.) and EB IVB (Late Early Syrian Period, ca. 2300–2000 B.C.), but quite a large number comes also from MB contexts, and especially from the outer fortifications, since the Old Syrian rampart was built at the beginning of the second millennium B.C. employing earth removed from the EB IV town, and therefore contained materials dating to previous periods.

EB IVA figurines from primary contexts were retrieved above all in the destruction layers sealing the structures of Royal Palace G and Building P4, and some specimens also come from the so-called “Red Temple” located in the northwestern sector of the Acropolis and from the “Hall with Painted Plasters” (Building FF2) at the foot of the southern Acropolis.¹²

The corpus of EB IVB figurines has been substantially incremented by the excavations in Area HH, where a series of superimposed sacred buildings dating from EB IVA to MB II have been brought to light (Matthiae 2008c; 2009b). More than 200 specimens come from levels related to the whole EB IVB sequence, with some pieces collected as residual in MB levels. Most of the figurines have been found in levels dated to the construction and use of private houses and Temples HH 4 and 5, roughly 2200–2100 B.C., but several specimens can be also related to the final EB IVB occupation (ca. 2100–2000 B.C.) (Peyronel in press b). These materials demonstrate the coexistence of figurines that follow the main types attested during the previous EB IVA period and of specimens attesting the first introduction of new types at the beginning of MB I. If the appearance of a painted production seems to be a characteristic of the period, documented also at the transition with MBA, female figurines with expanded limbs and open arms started to be introduced at the very end of EB IVB, anticipating the change in the conception and representation of the human body that marks the coroplastic of the Archaic Old Syrian period.¹³

Anthropomorphic figurines that appear during EB IVA and that continue to be manufactured also during EB IVB are characterized by a limited number of types, although their iconographic interpretation (above all the gender attribution) is not always certain.¹⁴ The fragmentary condition of most of the pieces makes it useful to adopt a typology that considers separately the different parts of the body (head, torso, and arms and legs), combining them when possible (Peyronel 2008b, 790). Some visual traits and elements have been considered more important for the identification of different iconographies, such

as the shape and decoration of the headdress, the position and presence/absence of arms, and the decoration of the torso. On the contrary, other elements and body parts display a very similar appearance in all the specimens, and seem to have less importance in distinguishing between different categories of personages. The lower part of the body is standardized and it is always column-shaped without marks for the legs, ending in a concave or bell-shaped circular or elliptical base. The schematic traits of the face are, without exception in the corpus of figurines from Ebla, the prominent and pinched nose, the large circular dotted pastilles indicating the eyes, the lack of the mouth/lips and chin, and the applied strips on the neck representing necklaces.¹⁵ Generally speaking, the details and degree of variation of the visual elements decrease from the top to the bottom of the figurine, and the most important elements conveying specific meanings are the head and the position of the hands. Sexual attribution through representation of genitalia is lacking in the EBA anthropomorphic figurines, and this is the main and most important symbolic difference with the following Old Syrian coroplastic.¹⁶ Taking into account the complete figurines or the pieces with preserved head and torso, the general types that can be identified are the following:¹⁷

- a. Female figurines with torso with lateral rounded expansion (Figure 4.1:1; Plate 7:1). Usually two simple symmetrical oblique incisions intersect at the centre of the torso, but are attested also double and triple lines, asymmetrical lines, fringed lines, and other variants. This peculiar pattern of decoration and the lack of arms indicate that the figurines are dressed. The head is characterized by lateral long curls or pigtails, usually folded up, conical head top (plain, incised, or slightly curved), and central girdle or band that can be decorated by a central dotted element. In rare cases dots or applied pastilles indicate the breasts.
- b. Female figurines with the same torso as the previous type, but with the head characterized by a complex headdress constituted by two lateral expanded elements decorated by dots

or incisions and a curved high top protruding from the nape (Figure 4.1:2; Plate 7:2).

- c. Anthropomorphic figurines (gender uncertain) with torso of the previous type, with or without crossed lines, and head with conical top and two or three applied pastilles at the sides of the face. The lateral expansion of the torso can be slightly pointed and decorated with strips (outstretched arms with bracelets?) (Figure 4.1:3; Plate 7:3).
- d. Male figurines with torso with crossed lines and rounded lateral expansions and head with a decorated helmet (Figure 4.1:4; Plate 7:4).
- e. Male figurines with undecorated torso with rounded or slightly pointed lateral expansions and rounded or flattened head with short curls or with incisions indicating the hair (Plate 7:5).
- f. Anthropomorphic figurines with rounded torso and applied forearms bent to the chest (Figure 4.1:5; Plate 7:6). On the basis of the Hama evidence (see above, Hama type a; e.g., Fugmann 1958, fig. 93 3A382), it is possible that a flattened or rounded head with short curls, known by several specimens, was associated to this kind of torso, but no figurines with both parts preserved are attested at Ebla.
- g. “Euphrates”-type anthropomorphic figurines with pronounced shoulders and freely modelled arms at the breast (sometimes indicated by dots or pastilles) and applied single or multiple strips on the neck as schematic ornaments (Figure 4.1:6; Plate 8:1). It must be recalled that these figurines are documented only by fragments of chest without a head. Some of them might be direct imports from the Euphrates region, and others are probably local imitations in a cursory style. However, their chronological range is not clear in Ebla, since none can be dated with certainty to EB IVA (destruction level of Royal Palace G) and most of the specimens come from EB IVB levels (Peyronel 2008b, 791–92).

Most of the animal figurines are quadrupeds.¹⁸ Several genera and species are attested by a variety of types, although the schematic representation of diagnostic features makes a precise definition of the depicted animals very difficult (with the exception of hedgehogs, bovids, and rams).¹⁹ The presence of two main groups of quadrupeds with a long neck can be singled out by the presence or the lack of incised decorations on the body. The long neck, the small muzzle without horns, and the short body are features that are difficult to correlate with any animal genera, and it is possible that these figurines were intended as some kind of composite or fantastic creatures. The fragmentary condition of the artefacts often prevents a precise identification of the quadrupeds, especially when the torso and body are the only parts preserved.²⁰ Finally, it must be recalled that animal figurines have often been ignored or only briefly treated in the Near Eastern coroplastic studies, which are primarily devoted to anthropomorphic figurines and their meaning, preventing a comparative evaluation of the Eblaite material.²¹ Taking into account the problems mentioned above, and without exhausting the variety of animal representations in the Eblaite coroplastic, the main types attested during EB IVA, which also continued to be produced until the end of the third millennium B.C., are the following²²:

- a. Quadrupeds (equids? gazelle? fantastic animals?) with short body without decoration, pointed legs, and long cylindrical neck ending with a very schematic head with pointed or rounded ears, in which the small muzzle can be horizontally pierced (Figure 4.1:7; Plate 8:2). In some cases the muzzle is more pronounced and a schematic bridle is applied, allowing the interpretation of the figure as an equid.
- b. Quadrupeds (caprines?, fantastic animals?) with incised oblique and zig-zag lines on the body and quite long neck (no specimens with head and muzzle preserved) (Plate 8:3).
- c. Quadrupeds (caprines?) with a miniature vase applied at the end of the back (with or without incised decoration), in some cases with incised decoration on the body (no

- complete examples), usually with a thick and quite long neck (Plate 8:4).
- d. Quadrupeds (caprids ?) with a high vertical element on the back, usually with incised decoration on the body (no complete examples) and long neck (Figure 4.1:8; Plate 8:5).
 - e. Rams with massive body, short legs, and horned head (very rare during EB IVA, few specimens attested in EB IVB).
 - f. Bulls with short and massive body, head with curved horns (few specimens attested in EB IVA and B periods).
 - g. Hedgehogs (or porcupines) with rounded hollow body divided into segments by incised lines and decorated by oblique incisions or notches representing schematically the spiny pelage, circular dots as eyes, pointed muzzle, and small legs (Plate 8:6).

The most striking evidence is the predominance of quadrupeds that cannot be easily linked to any animal species, the main features of which are the long neck and the short body. Their interpretation as equids is unlikely when the specimens have small heads, whereas the lack of horns excludes that they are caprines or gazelle. Moreover, no comparisons can be traced outside northern inner Syria, and these figurines find no parallels in animal iconographies documented by glyptic materials, miniature statuettes in precious materials, and wooden carved inlays of the same period (see Matthiae 2010b, 152–88). In the wooden inlays, bulls, gazelles, and felines (lions, lionesses, and leopards) are attested and characterized by realistic traits, showing that coroplastic and artworks in precious materials follow different tastes and partially convey different symbolic meanings (Dolce 2000).

Lions with open jaws, small ears, applied dotted eyes, and manes covered by incisions are attested only in a few specimens dating to the EB IVB period (Peyronel in press b). In spite of the important role of this animal in EB IVA sphragistic and in the composite statuary of EBA Syria and Mesopotamia, no contemporary terracotta figurines have been identified with certainty in Ebla.

The presence of several hedgehog figurines is also meaningful and suggests that the animal had a peculiar symbolic meaning for the Eblaite people, possibly linked to fertility aspects.²³

3. THE COROPLASTIC MATERIAL FROM ROYAL PALACE G: CONTEXTUAL DATA

More than 350 figurines dating to EB IVA-B come from Area G. Most of them could be originally related to the architectural complex of Royal Palace and can be assigned to EB IVA (2400–2300 B.C.), and ca. 100 were retrieved in the destruction layers directly over the pavements or in the collapsed debris inside the rooms of the palace.²⁴

The specimens from the destruction level that marks the end and the final sack of the EB IVA town are spread over several sectors and wings of the public building (see Peyronel 2008b, 789–90). Animal and anthropomorphic clay figurines were found together, suggesting that no direct relations exist between typological classes/types and spatial distribution. The main concentrations occur in the large Court of Audience, the Administrative Quarter, the Southern Unit, and the Northwestern Wing of the Central Complex, whereas clay figurines are almost completely absent from the Western Unit of the Central Complex, devoted to food transformation.²⁵

It is interesting to note that several specimens have been collected from stratigraphic layers of collapsed debris at elevations that suggest their location on the first floor at the moment of the destruction of the palace. Albeit it is difficult to gather precise contextual information from these materials, it seems probable that they come from the supposed residential quarter of the members of the royal court on the upper floor, accessed by the so-called Ceremonial Staircase located at the northeastern corner of the Court of Audience.²⁶ In particular, a high number of figurines were found in the level related to the collapse of the walls over the Monumental Stairway (L.2877, sixteen figurines) (Figures 4.2–3) and in the rooms immediately north and south of the staircase (L.2890 and L.2764, respectively eight

and nine figurines) (Figures 4.4 and 4.5). This is the highest concentration attested in the palace, comprising zoomorphic (twenty-five specimens, including quadrupeds with vessels at the back) and anthropomorphic (nine specimens) fragmentary figurines of different typologies.

A similar distribution in the palace has been observed for personal ornaments (earrings, pins, and other bronze items) and implements commonly used by the elites, such as spindle whorls and bone and bronze needles/awls. This scattered spatial pattern at different elevations contrasts with that of economic and record-keeping tools and of precious materials and objects, which were stored and used for administrative and ceremonial purposes in specific rooms at the ground floors, most of all in the Administrative Quarter (precious raw materials, precious items, weights, and tablets) and in the northern wing at the back of the Court of Audience (sealings and precious objects) (see Peyronel 2006b).

However, clay figurines have been retrieved also directly on the floors in the destruction layers: eight specimens come from the presumed throne room of the Administrative Quarter (L.2866). L.2866 is a large rectangular room with three small square rooms on its eastern side. It might have been used by the king as a reception room, and over its floor precious materials, including gold inlays and several cuneiform tablets, have been found. A door on its southern side leads to two rooms (L.2982, L.2984) in which a large amount of precious items and several kilograms of raw lapis lazuli were discovered, suggesting that this annex was a palatial treasury, possibly the *é-siki* mentioned in the archives (Matthiae 2010b, 83, 386).

The presence of terracotta figurines should therefore be linked to their ideological/symbolic meanings, and an apotropaic function of the images cannot be excluded. The pieces represent five fragments of quadrupeds and three anthropomorphic figurines of the same types attested in the other rooms of the palace.

Six figurines (two quadrupeds and four anthropomorphic figurines) come from room

L.2586 in the Northwestern Wing of the Central Complex, in which forty-two cuneiform tablets were found on the floor. This part of the palace might be linked to the residential quarters and was used to store pieces of furniture, as revealed by the carved wooden inlays decorating a throne and a table discovered in room L.2601 (Matthiae 2010b, 167–72; Dolce 2006).

Five figurines (all of them representing anthropomorphic figurines) were collected on the floors of L.3462, L.3471, and L.3474 in the Southern Quarter, which has been considered a kind of peripheral residential area of the palace (see Matthiae, in this volume), whereas three anthropomorphic figurines (including the complete specimen TM.83.G.118, Plate 7:1) have been retrieved in the Southern Wing of the Central Complex (L.3500 and L.3512), in which a large number of complete pottery vessels were stored (see Mazzoni, in this volume, and Mazzoni 1988). In this case the relation between the figurines and their location is more difficult to evaluate, although it must be noted that besides pottery and clay figurines few other objects come from this wing of the palace.

Summing up, the widespread distribution of the materials inside the public building is an indication of a general use by the elites. This evidence is strengthened by the higher number of items coming from layers related to the collapse of the first floor, in which the residential quarter was probably located, and from supposed peripheral residential rooms (Southern Quarter). No workshops for the manufacture of terracotta objects and pottery have been found in the palace, nor any evidence of intentional burying or hiding of figurines under the floor and/or in the walls that may suggest their use in specific apotropaic or magic rituals. The breakage of the items seems to be the result of the traumatic demise of the building and of post-depositional events such as the progressive collapse of the structures after the fire and the destruction.

A widespread distribution similar to that recognized in Royal Palace G can be observed in the only other EB IVA building extensively excavated (Building P4 in Area P South) (Peyronel

2008b, 790). Also the EB IVB figurines retrieved in Area HH have been found in levels related to the temples and the private houses around the sacred buildings, without any apparent difference in types and associated materials (Peyronel in press b).

Considering the evidence from Hama and Ebla together, anthropomorphic and animal terracotta figurines were attested in private and public (palatial and cultic) contexts, showing that they were used by common people and by the elites in different contexts. Therefore, the pattern of contextual distribution noticed in the Euphrates sites, where figurines seem to be linked above all to domestic structures, cannot be recognized in inner Syria (Cooper 2006a, 117–18). On the basis of the Euphrates evidence, several scholars propose an apotropaic magic function of the figurines performed through acts of intentional burning, breaking, burying, and discharging of the images (see Petty 2006, 197–98; Cooper 2006a, 119–20; Meyer 2007). However, the materials from Ebla do not contain any secure evidence that can be considered a clue to these deliberate actions, and only a general function linked to popular beliefs (ideological and/or cultic) can be inferred by crossing typological and contextual information. The figurines might be considered personal objects having a plurality of meanings, which possibly include also a general function related to popular ritual or cultic performances. Thus, the figurines depicting human personages but also supranatural beings and animals could have been used as images symbolizing shared concepts or values of the Eblaites, linked to the sociocultural structures in a different way than the “official” cult and the royal power’s expression, which were rather transmitted through a limited number of iconographies. Intersections between these two realms of conceptual expressions were probable, but it is striking that the clay figurines were not shaped according to the figurative schemes of the most important human personages, divine images, or animals found in seals and seal impressions, miniature statuettes, standards, and precious furniture. They cannot be considered minor replicas for common people of higher artistic productions, and they probably

reflect a complex sphere of ideological meanings, deeply rooted into the local cultural context and unfiltered by the political power.

NOTES

- 1 The EB IVA-B terracotta figurines from Ebla will be published by the author in a forthcoming volume of the series *Materiali e Studi Archeologici di Ebla* (Peyronel in press a).
- 2 Syrian clay figurines dating from EB II-III have not been studied in detail yet, but it seems that anthropomorphic figurines are very rare, usually coarse, very schematic, and without typological features that allow to reconstruct a direct development from EB III to EB IVA. On the contrary, animal figurines (mainly bovids or caprines) and chariot wheels are quite common, but they are apparently very different from those attested during the following period: see for example Braidwood and Braidwood (1960, 372, fig. 289:1–4 [Amuq sites]), Fugmann (1958, figs. 37, 39, 42, 46, 54), Thuesen (1988, 172–75 [Hama K]), Peyronel (2011a, 112, fig. 39 [Tuqan IC]).
- 3 The most important result of that seminal work was a first clear identification of northern Syria (Badre’s “région de l’Oronte”) female and male figurines dating from the Middle Bronze Age (Badre 1980, 44–47, 161–265, plates 1–25), belonging to a strong local production that is now well defined thanks to the publication and study of the materials from Ebla and other Syrian MB sites (Marchetti 2001; see also 2000; 2007).
- 4 See in particular the figurines from Tell Selenkahiye (Liebowitz 1988; van Loon 2001), Tell Halawa A (Meyer and Pruss 1994; Meyer 2007), Tell Munbaqa (Czichon and Werner 1998), Tell el-Abd (Pruss 1995), Umm el-Marra (Petty 2006), Tell Khuera (Klein and Hempelmann 1995; Meyer 2007), Tell Bia (Strommenger and Miglus 2010), Tell Brak (Oates 2001; McDonald 2001), Tell Mozan (Hauser 2007. For a chronological evaluation of the Jezirah figurines see Pruss 2011). A forthcoming study of the Euphrates coroplastic by Sakal will be published on the Subartu series.
- 5 The figurines in Badre (1980, nos. 37, 42, 48, 50, 52, 53, 54, 55, 93, 98a) have been assigned to phase J, but they should be dated to MB IA (see Marchetti 2001, 187–90); nos. 30 and 59 can be dated to a very late EB IVB phase (transitional EB IVB/MB IA according to Marchetti 2001, 187); nos. 60 and 75, albeit dated

by Marchetti to MB IA (ibidem, 200, 204), should be considered local copies of late EB IV types of the Euphrates region. Finally, no. 70, related to Phase G, is without doubt dated to EB IV.

- 6 See Fiorentino (2006b, 116, 117 fig. 49:a [female figurine with expanded rounded torso and long curls at the sides of the neck]) and Peyronel (2006c, 222, 227 [pillar-shaped legs with concave base]; 2008c, 61, fig. 22, 63 [female figurine with pillar-shaped legs and arms applied to the chest]).
- 7 See for example Dornemann (2008c, 50, fig. 31): head with elaborated hairstyle formed by two long lateral curls and a curved high element on the top, matching several specimens from EB IVA Ebla.
- 8 The terracotta figurines of the first and second millennia retrieved during the Oriental Institute excavations have been recently published by Pruss 2010, 35–45, 323, plates 1–3; see also Badre 1980, 252–61, plates 21–24 (Amuq sites).
- 9 The catalogue includes three specimens from Chatal Höyük (unstratified), fourteen from al-Judaïdah, and thirteen from Tayinat. Only one figurine can be assigned to Phase I (Pruss 2010, no. 19) and five are related to the so-called Second Mixed Range (ibidem nos. 2, 5, 20, 23, 28), whereas the others have been related by the excavators to later chronological phases (K, L, O, P-Q), or are without context.
- 10 Marchetti (2001, 228) has classified some of these figurines in a transitional EB IVB/MB IA group.
- 11 At the time of a preliminary presentation of the EB IV Eblaite coroplastic, the total number of ca. 350 specimens (Peyronel 2008b, 787) included artefacts discovered before the 2004 excavation season and filed in the MAIS small finds database as dated specimens. Here the finds discovered during the 2005–2009 are added (ca. 200 figurines), together with 150 figurines stored in the Idlib Museum (mainly from the excavations of the 1970s) and directly filed by the author, which were not dated at the time of their original description in the MAIS database.
- 12 For a general description of these contexts see Matthiae, in this volume.
- 13 Marchetti (2001, 27–32, 62–64, 85–87) has grouped some specimens in a transitional EB IVB/MB IA horizon, which can be dated, according to the Area HH evidence, to the very end of the third millennium B.C.
- 14 Manufacturing techniques and clay fabrics show that the production was quite standardized during EB IVA: figurines are freely modelled and decorated with incisions, dots, or applied elements; painting is not attested (it appears only at the end of the EB IVB); fabrics are usually light brown, whitish, or pinkish in color; and clay has a fine texture with very small mineral inclusion. See Peyronel (2008b, 790–91, 795–96, fig. 5).
- 15 It is interesting to note that we find this standardized representation of the face also in the majority of the Euphrates anthropomorphic figurines, suggesting a shared symbolic meanings conveyed by the deliberate omission of some traits (above all the mouth) and by the presence of a same modality of manufacture for the eyes and the nose, which are always the dominant elements of the head: see Petty (2006, 64–65), in which the omission of the mouth is considered as a visual indication that the figurines cannot be enlivened.
- 16 It is only at the very end of EB IVB (ca. 2100–2000 B.C.) that the beginning of a change in the conception of the clay figurines can be recognized, with some figurines showing expanded limbs, vertical dots marking the division of the legs, and dots indicating the pubic region (Peyronel in press b). This period also marks the first step in the elaboration of female figurines, which develops according to a codified body appearance during MB IA: see Marchetti (2001, 27–44).
- 17 For a typology of the different parts of the body, see Peyronel (2008b, 790–93).
- 18 Animals were manufactured with fine mineral-tempered clays of the same type observed in the anthropomorphic figurines; decoration consists in incisions or dots, and the surface can be sometimes slipped. A peculiar manufacturing technique was used to model most of the quadrupeds, consisting in splitting a kind of clay envelope (3–5 mm in thickness) over the cylindrical core of the body and adding or shaping legs, tail, and other parts on this external covering: see Peyronel (2008b, 793).
- 19 In this regards it could be useful to compare the animal representations with the zooarchaeological evidence in order to verify the possible intersections between the visual meaning of the terracotta figurines, the animal exploitation in the Ebla *chora*, and the impact of the animal world on the society and economy of the kingdom: see Minniti, in this volume, and especially the approach adopted by Hauser in his study on Mozan animal figurines (Hauser 1998, 2007).
- 20 Facing the same problem in his study of the EBA animal figurines from Tell Mozan, Hauser try to identify genera and species adopting a methodological ap-

- proach that considers the measures (dorsal, ventral, cranial, caudal, left median and right median, taken at the point where the plane intersects the anatomical detail, and borrowed from anatomical analysis from veterinarians) and the relative proportions of the body parts as a way to understand the animal depicted (Hauser 2007, xxvi-xxviii). According to Hauser, the figurines had an “iconic reality” that the ancient people was able to read, and the animal depicted corresponded to a shared “mental template” consistent with a schematic representation of living animals (*ibidem*, 2–20).
- 21 This documentary void hampers a comprehensive evaluation of the EBA coroplastic, since the evidence shows that anthropomorphic and animal figurines were manufactured in similar percentages. Specimens of both classes have been found in similar contexts, sometimes together, probably indicating that they share similar “value” and convey symbolic meanings of equal importance. A tentative classifications of EBA animal figurines have been carried out by Hauser (2007) on the Mozan corpus from Palace AK and by Oates (2001) on the equids figurines from Tell Brak; for the material from the Euphrates see Meyer and Pruss 1994, 111–55 (Halawa A) and Strommenger and Miglus 2010, 51–65 (Bia). It is important here to stress that any coroplastic study must be carried out considering both classes of figurines together, since there was no clear-cut functional difference in the Bronze Age cultures: see Parayre (2003).
 - 22 Besides the animals listed here, some rare figurines can be interpreted as representations of dogs, birds (possibly doves), and bears. Pigs seem to be absent in the EB IV Eblaite coroplastic repertoire of EB IVA, whereas a unique figurine of a monkey came from Area HH and is dated to EB IVB (Peyronel in press b).
 - 23 Hedgehogs were not depicted in the MB Eblaite and Syrian coroplastic and they are rare in the Old Syrian glyptics, whereas in Mesopotamia the hedgehog/porcupine is attested since the fourth millennium B.C. with small statuettes (see Van Buren 1939, 24–25; Watanabe 2002) and it is also frequently depicted in the Old Babylonian cylinder seals (see for example Collon 1986, 43–44). See also Clason (1993).
 - 24 In Peyronel (2008b, 789) only sixty-three clay figurines have been related to the destruction level of Royal Palace G. The preliminary quantitative and contextual evaluation has been carried out on the basis of data gathered from the MAIS database, which are now being integrated by the author (see note 9).
 - 25 For a description of the different quarters of Royal Palace G brought to light see Matthiae (2010b, 377–87) and Matthiae, in this volume.
 - 26 The hypothesis that the royal residential quarter was located at the upper floor of the palace between the Ceremonial Staircase and the Monumental Stairway has been advanced by Matthiae on the basis of several architectural features (see Matthiae 2010b, 75–80).

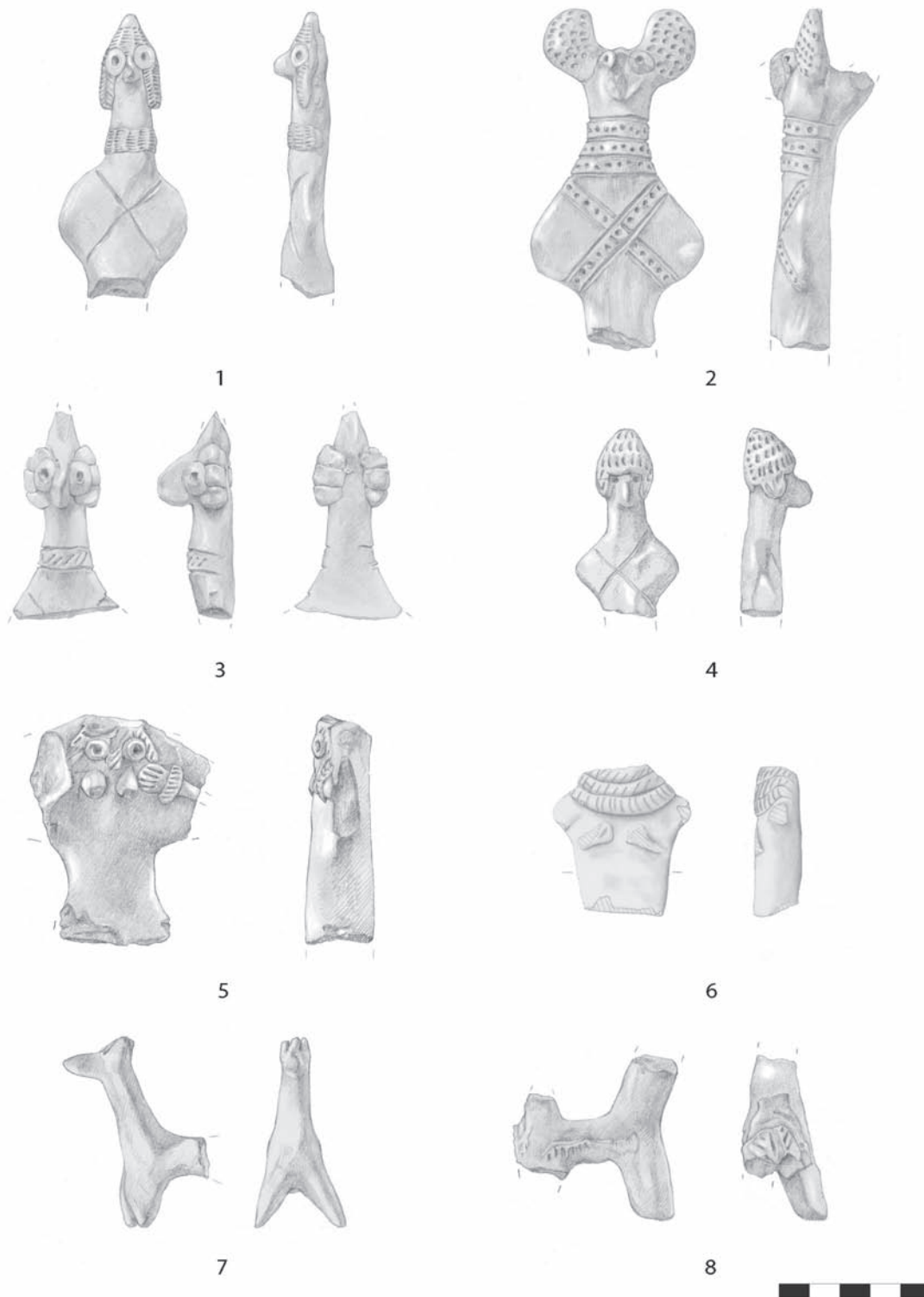


Figure 4.1. Main types of anthropomorphic and animal figurines from Ebla. 1. TM.77.G.150; 2. TM.78.Q.202; 3. TM.76.G.489; 4. TM.03.FF.420; 5. TM.76.G.326; 6. TM.94.P.208; 7. TM.76.G.801; 8. TM.76.G.578.

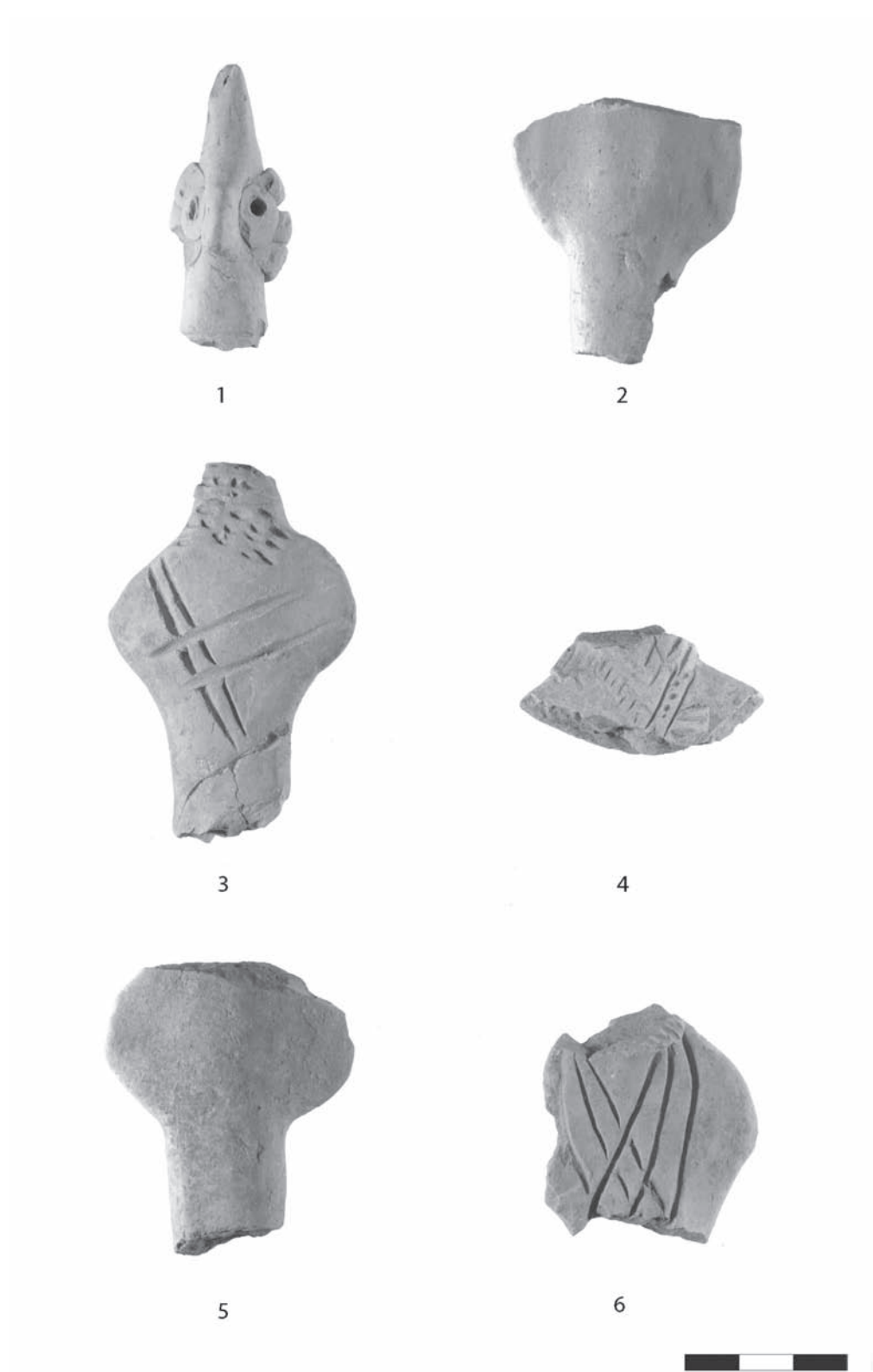


Figure 4.2. Clay figurines from the destruction level over L.2877 (Monumental Stairway). 1. TM.76.G.352; 2. TM.76.G.357; 3. TM.76.G.359; 4. TM.76.G.362; 5. TM.76.G.390; 6. TM.76.G.549.



Figure 4.3. Clay figurines from the destruction level over L.2877 (Monumental Stairway). 1. TM.76.G.387; 2. TM.76.G.389; 3. TM.76.G.392; 4. TM.76.G.420; 5. TM.76.G.421; 6. TM.85.G.187; 7. TM.85.G.188.



Figure 4.4. Clay figurines from the destruction level over L.2890 and L.2764. L.2890: 1. TM.G.76.479; 2. TM.G.76.485; 3. TM.76.G.487; 4. TM.76.G.486/2. L.2764: 5. TM.76.G.636/1; 6. TM.76.G.544.

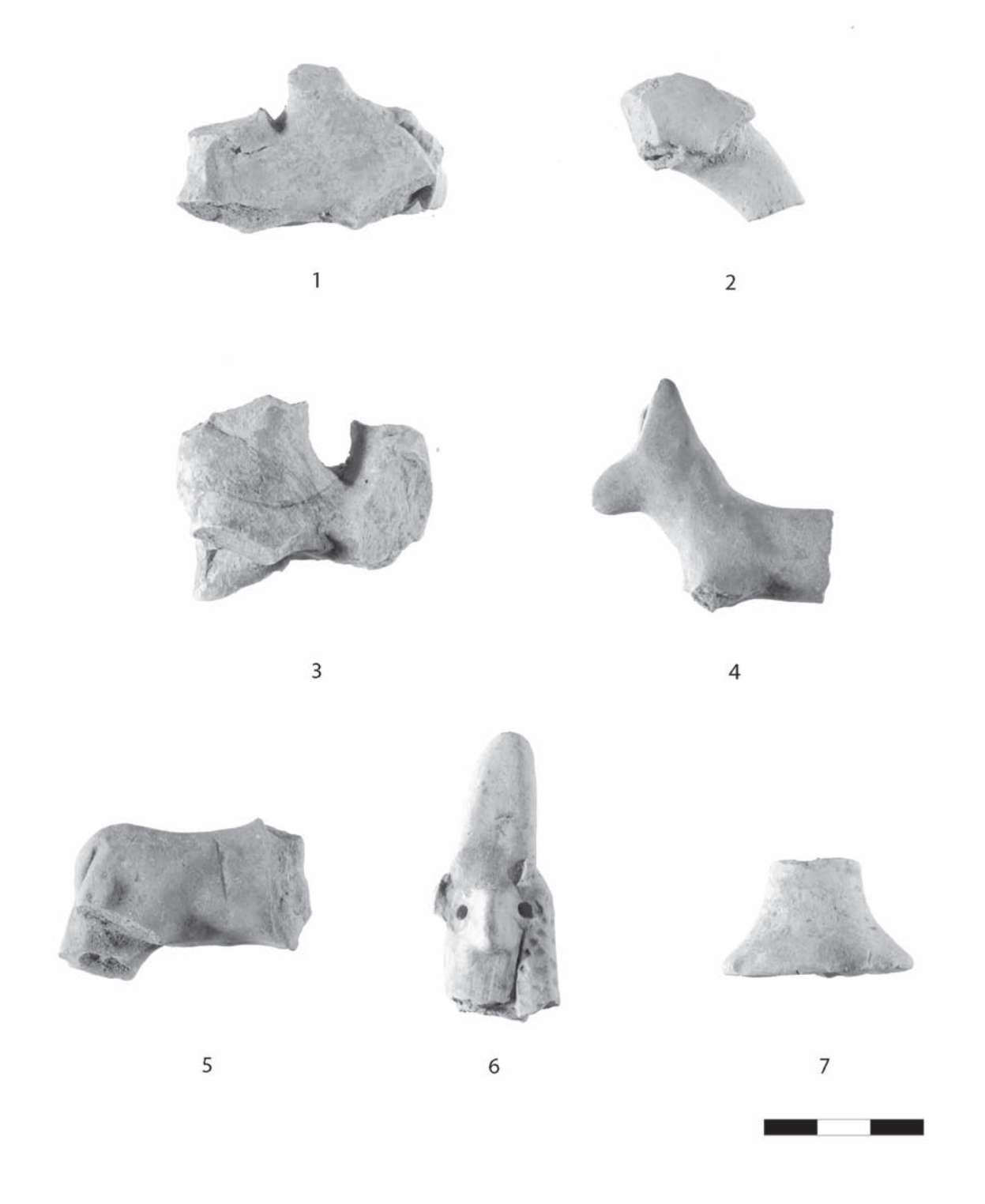


Figure 4.5. Clay figurines from the destruction level over L.2764. 1. TM.76.G.545; 2. TM.76.G.546; 3. TM.76.G.552; 4. TM.76.G.555; 5. TM.76.G.807; 6. TM.76.G.845; 7. TM.87.G.83.

CHAPTER 5

CENTRALIZATION AND REDISTRIBUTION

The Pottery Assemblage of Royal Palace G

S. Mazzoni

1. INTRODUCTION

The pottery assemblage from Royal Palace G has an enormous documentary potential for reconstructing the many aspects of the life of an organism that, in the third millennium B.C., embraced institutional activities, the storage of products, and the preparation and distribution of food for internal consumption as well as exchange and redistribution. The assemblage incorporates a vast amount of materials found buried in the burnt destruction layer of Palace G (Plates 9:1–2).¹ These were parts of equipment and sets of vessels found mostly in situ and pertaining to a limited time span, corresponding to the final years of the life of the palace. This layer was not an even and regular deposit; it was preserved variously according to the different units of palace, founded not on flat ground but at different elevations on the slopes of the older Early Bronze III citadel and at its base. This mainly accounts for the fact that in the different units the materials, contexts, and deposits of this same layer had different local stratigraphic positions and were consequently registered according to the local sequences of levels. A further documentary trait, quite peculiar to this palace, is linked to the presence of collapsed intermediate floors (mezzanines) and first floors with their associated materials. In these cases complete or restorable vessels were documented and were added to the corpus of the vessels found in situ on the floors, the benches, and various installations. Furthermore, the thick unburnt deposits from the collapse of the walls of the palace

contained thousands of sherds that were analyzed, processed, and registered but are not inserted in this analysis, which deals with the vessels found in primary contexts in the destruction level of the palace. Only a part of these materials were found complete or in conditions permitting their restoration: 221 Table Ware vessels and 187 restored jars are currently held in the Museum of Idlib, and a few in the museums of Aleppo and Damascus. Here may lay the limitation as well as the potential of this documentation. This comes in fact from a single layer and can document one particular phase, the final life of the Ebla palace. It can be an excellent diagnostic tool for this event and the terminal years of the palace; we can, however, only speculate on the time of its being in use. The connection with the archives and with the residuals of seeds and burnt wooden beams, with associated ¹⁴C analysis, help to determine the relative and absolute chronology for the occurrence of this pottery in the burnt level, providing a reliable *ante quem* term for the period of its use at Ebla. We have evidence of the stratification of the palace floors only in two units, the Administrative and the Central Unit West, and only small portions of earlier floors have been cleared, providing few materials in place. Remains of an earlier phase with floors containing abundant materials were instead found in the northeastern suite of Central Unit West. This has allowed us to postulate a preliminary sketch of a pottery sequence of the palace,² which, however, has to be corroborated by additional well-deposited materials. We can, therefore, conclude that the pottery assemblage

documented in the destruction layer of Royal Palace G is representative of a quite limited chronological time span.

The main documentary potential of Palace G pottery corpus consists, however, in the quite unique state of preservation in the destruction layer in the whole complex and its many functional units. Sets of vessels with their contents were found stacked where they were used and stored, furnishing firsthand evidence of how and where the main foodstuffs were prepared, stored, and readied to be consumed.

2. WARES, FABRICS, AND VESSELS

The pottery assemblage of Palace G includes locally produced Table and Preservation Wares, which constitute the greatest portion of the documentation, while Kitchen Ware is relatively less numerous. A minor but still relevant portion is represented by imported and specialized vessels, a factor depending on the accumulative character of the building. For this same reason, it is not surprising that storage jars of different types, shapes, and wares match in number the Table Ware, offering the picture of a prevailing and pervasive function of storage and accumulation of food, not only for limited daily consumption by the élites but also for the maintenance of dependants and specialized workers, according to the details registered in the administrative texts.

Table and Preservation Wares offer evidence of a number of distinct fabrics and productions made in the area of Ebla; they are characterized by local pastes and clays, distinct technologies of modeling and firing, and different modes of production. This variety is mostly connected to the functional specialization of the vessels and the related adoption of different modes of production.

2.1. Table Ware

Table Ware consists of common simple and fine simple mineral-tempered types fired at high temperatures, around 700–800°C, resulting in a buff/whitish/brownish homogeneous color (Plates 9:3–4). The well-sieved and fine clays with

their homogeneous aspect attest to a standardized process of manufacture in workshops specialized in pottery production, whereby pots were always thrown on the wheel.³ However, despite the impression of a clear standardization that we get from a few ubiquitous forms, such as the cylindrical-shaped goblets, wares of the same fabrics could differentiate themselves according to the texture of the clays, i.e., the sieving and levigation of the paste and different firing conditions. Some items show a greenish color, probably from overfiring; by contrast, a few can show a core of a different tone of the same color as a result of slow or low firing. Temperatures, quality of fuel, and the flow of oxygen and smoke were not stable, resulting in a variation in the products obtained. Common simple and fine Simple Wares of the same fabrics consequently display a quite homogeneous appearance, but on closer investigation they reveal slight but persistent differences, with pastes more or less porous and well sieved, different mineral tempers, and also occasional differences in surface finishes and self slips.

Fine wares constitute a local production distinguished by more controlled and higher temperatures of firing and a fine clay texture, with well sieved and levigated pastes with mineral temper; they are high-quality variants of the same Simple Wares. Goblets and bowls of a reddish well-fired clay, close to and probably imitating Metallic Wares, are not rare, but they are less frequent than the common Simple or fine Simple buff Wares.

Functional surface finishes with a decorative effect are not rare. Horizontal burnishing characterizes both bowls and jars with thickened rims. This was mainly a device used to obtain watertight surfaces, produced by rubbing the surfaces with a soaked stick in a more or less regular way. Jars with thickened rims, modeled by coiling and well fired with outer burnishing, were also produced in a very fine and hard texture clay imitating Metallic Ware, reddish with outer greenish slip or greenish and fired at high temperatures (Figure 5.1).

Special wares are not so common and are connected to a few distinct forms, certainly imported from the Euphrates region or the north-east, the Jezirah and Khabur area. Metallic brownish-blackish Wares are represented by a few “Syrian Bottles” (Figure 5.2), single small closed cups, and flaring everted rim bowls (Figure 5.3), all ring-burnished. A few corrugated goblets and ridged bowls, in brown or dark-reddish ware with mineral inclusions, belong to a distinct manufacture; the similarity in composition and aspect with materials from Al-Rawda and the eastern steppes adjacent to Ebla may indicate a probable provenance from this area.

Noteworthy is a handled cup of the class of the so-called *depas amphykipellon* and tankards from southern Anatolia, which has a parallel in Tell Afis and comparisons in Tarsus and Kültepe (Figure 5.4).⁴ A pan with a long handle, corrugated inside, and made of a whitish paste (Figure 5.5), might also be an import from Anatolia and finds comparisons in a similar vessel, also probably imported, from the hypogeum of Tell Ahmar, and a class of bronze pans with central omphalos that were widespread in Mesopotamia and Anatolia.⁵

Decoration is quite rare and consists of brownish-blackish horizontal stripes painted on the small juglets, deep bowls, and “Syrian Bottles” (Figures 5.6–7). The trefoil mouth pitcher can also be decorated by blackish painting on the shoulders and the single cylindrical handle (Figure 5.8); vertical wavy lines on the body are suggestive of dropping liquids. A rarer decoration consists of a geometric pattern of cross-hatching and triangles (Figure 5.9). Lids with a central knob for handling could also be painted in fine stripes and a star (Figure 5.10). A few specimens of white-on-black painted goblets are probably imported from the regions of Hama and Al-Rawda, where they are better documented. Corrugation, resulting in creased bands of variable width, prevails in the goblets and is possibly a device to avoid slipperiness, which would be consistent with a use of the goblets for drinking.

Table Ware presents many forms and formal variants, which attest to a marked specialization

for drinking, pouring, eating, and serving food: goblets, cups, bowls, funnels, lids, strainers, small jars, pitchers, teapots, and their many variants illustrate a rich composite set for specific functions. Corrugated goblets, also called beakers, with plain flat bases were ubiquitous and produced in mass (Figures 5.11–12); the thickened rim bowls, ridged, and expanded rim bowls (Figures 5.13–14), sometimes tripods (Figure 5.15), were less common, as were the rare conical cups with flat base. The goblets were produced in different sizes, ranging from miniature (Figure 5.16) to tall and large goblets; even though the capacity of most goblets ranges from 0.285 to 0.450/500 liters, a few clusters group around 0.56/0.70, 0.80/1.16, 1.80/1.93, 7.83/8.08, and 1.028 liters,⁶ indicating a certain amount of variation around five capacities (0.50/1.00/1.90/8.00/10.00 liters), and probably some degree of standardization.

Different kinds of pots for pouring liquids are attested, though not in very high numbers; in the total assemblage we can count forty-six pitchers (twenty-eight painted) with flat oval bases, twelve spouted small jars with expanded flat bases (Figures 5.17–18), and twenty so-called teapots with slightly concave or low ring bases and short, wide spouts (Figure 5.19). They could be painted and corrugated on the neck and shoulder. This quantity might reflect a very elitist circulation of possibly highly prized liquids and beverages, such as wine. A similar case is offered by the thirty so-called “Syrian Bottles” used for oils and ointments, which show capacities of 1.13/1.18 and 1.89/2.33 liters, and a variety of fabrics: Simple, fine Simple, Painted (Figure 5.7), Pseudo-Metallic, and Metallic Burnished Wares (Figure 5.2). The fine Ring-Burnished globular jars with flat bases (Figure 5.1) had a capacity of around fifteen liters, and with their small necks and closed mouths were destined to contain liquids.

2.2. Preservation Ware

Preservation Ware are differentiated by few fabrics following the functional specialization of the vessels, resulting in more or less standardized types, with slighter or more marked variations in the quality of the final products. We can,

therefore, recognize vessels for short-term storage and medium capacity, which could be also easily transported, and vessels for long-term storage and provisions, usually to be kept in fixed places.

A class of medium-size jars is marked by a buff porous fabric, mineral tempered, with outer slip often reserved in horizontal lines on the shoulder or combed with wavy lines (Figure 5.20; for further examples see Mazzoni 1994a, figs. 8–10). These jars with flat bases, cylindrical (more or less elongated) bodies, thickened and expanded rims also grooved for lids, and closed mouths, have standard capacities of around twenty and thirty-five liters.

The ubiquitous swollen cylindrical jar, with a flat base and grooved rim, presents a porous and large-grained texture of a buff/reddish clay, with mineral temper and rare chaff fired at medium temperature (Figure 5.21). Often slipped in light greenish/whitish colors, these jars were modeled by spiral coiling with the rims thrown separately on the tournette,⁷ and could be decorated on the shoulders by a simple wavy combed line or marked by pottery marks (Figures 5.22–23). Only one jar of this type was incised on its shoulder with the profile of a lion (Figure 5.24). One had also a cuneiform sign painted in red on the shoulder, but unfortunately it was too faded to be read. These were multifunctional containers, although their distinct porosity seems to indicate a prevailing and original use for water; porosity, in fact, allowed transpiration and evaporation on the outer surfaces thus keeping the contents cool. However, the fact that they have also been found filled by white floury substances, and their diffusion in the pottery corpus of Palace G, attest to a wider range of functions. A quite distinct storage fabric is documented by the class of ovoid jars with rounded bases, which can also have three cylindrical feet and ridged shoulder (Figures 5.25–26); they were usually produced in a compact well-fired clay, mineral tempered, sometimes self-slipped, and modeled by coiling with the swollen rims made on the tournette. They are less prevalent in Palace G than the grooved-rim porous jars, and they seem to be concentrated in a few rooms of the Administrative Unit. They

have a capacity of around 60–80 liters. The two types show a different regional circulation and distribution. The cylindrical grooved-rim porous jars were produced in the regions of Hama, Al-Rawda, Ebla, and Afis, with a very occasional appearance in the Amuq. The ovoid and tripod ovoid jars were instead diffused at Ebla and on the Euphrates, and might have originated from this area.

More rare and certainly imported are the red/brown Burnished Ware jars with everted flaring and grooved rims; these are documented by large-size storage jars and smaller globular jars with small, flat, or slightly concave bases (Figure 5.27). They were probably imported from southwestern Anatolia and the Amuq area. In fact, a jar of this type, incised with a wave pattern on the shoulder, has close parallels with identical vessels from Anatolian sites.⁸

A further distinct fabric used for cooking and storage is represented by the ovoid jars, grooved outside also in a net pattern, either with vertical flat rims swollen inside or collared with banded rims (Figures 5.28–29); they were produced in a very porous reddish/brownish paste rich in minerals, mostly calcite temper. The porous appearance of the texture of the clay is quite close to the Kitchen Ware, but is less fine and more large-grained, and apparently coarse. Nineteen vessels of this class were found connected with fireplaces in room L.2890, spread in fragments over them with their round bases blackened by fire. The special combing was a device to expand the outer surfaces and consequently increase heating; the distinctly porous fabric, rich in calcite, was also intended to increase resistance to thermal stress in use over fires.⁹ The fact, however, that these jars were also found in different contexts and inserted in benches apparently attests to a multifunctional use of these containers, whose original function might have been connected with the cooking of special substances and food. They could contain between 40 and 80 liters of food.

Kitchen Ware is characterized by the bead-rim, hole-mouth globular pot, often with thin walls and rough outer surfaces, made with porous but fine reddish or brownish pastes with mineral grits

and little chaff. A few small pots of brownish paste have a bead-grooved rim (Figure 5.30). The incense burners with tall fenestrated cylindrical pedestals and expanded flat base (Figure 5.31) are characterized by the very rough appearance of the outer surfaces.

2.2.1. Jars Impressed by Cylinder Seals

Two types of jars were impressed by cylinder seals at Ebla: the ovoid and tripod jar with thickened rim (Figures 5.32–33) and the corrugated globular jar/pot with vertical rims (Figures 5.34–35). The former were impressed on the outer walls of the body in different positions, while the latter were impressed on the outer rim. These types with their impressions were distributed along distinct regional circuits: a northern circuit including Ebla, the Euphrates, and Quweiq areas for the first type, and a central circuit including Ebla, Hama, the Orontes, and Al-Rawda regions for the second. Different hypotheses have been put forward on the function of the impressed jars, and there is no common consensus among the scholars: administrative, functional, symbolic, or decorative uses have all been proposed with convincing arguments.¹⁰ The impressions might have been labels conveying some message in relation to the function and contents of the jars, using a variety of motifs possibly linked in a symbolic association and allusion to fertility: as a prevailing subject, the mastery over animals and the herding scene might have possessed a protective and beneficial role, similar to the numerous symbolisms relating to fertility, sexual intercourse, and pregnancy.¹¹ The new documents that have increased my corpus of impressions from the Levant and Anatolia from 208 to more than 600 items¹² do not help to solve the question. The single jar impressed with a herding scene and the three jars with vegetal and geometric designs from L.2890 of Palace G, together with other corrugated jars found over and around the fireplaces with residuals and consistent traces of firing of probably fat substances, remain among the most significant pieces of evidence on the nature and character of this practice (Figure 5.35).¹³ These large pots contained between forty and seventy liters each,

indicating a collective commensality consistent with the location of room L.2890 adjacent to the audience court in the ceremonial wing (Mazzoni 1993, 399–400, figs. 1–5, plates 72.1–5). As for the food contained and cooked in these vessels, the remains from L.2890 (see Wachter-Sarkady, in this volume) apparently do not furnish sufficient data to go beyond simple speculation. This is also the case of the hypothesis that bitter vetch was cooked in these vessels, put forward on the basis of materials from Tell Qarqur, where this vegetable was found in large quantities in different contexts, as it was in Tell Arqa (Graff 2012, 38–39). The recovery of different wild herbs in the room might indicate the preparation of special products such as ointments or curative treatments; herbs were in fact found also in Area P and they were certainly processed as a valuable resource by the central administration for inner consumption by the elite and occasional exchange. However, the large capacities (40–70 liters) of the jars from L.2890 would be more consistent with foodstuffs destined to a wider use and consumption and probably also of perishable and no longer visible nature.¹⁴

2.2.2. Pottery Marks

A few marks were incised or impressed on the vessels before firing. Single goblets, bowls, and the deep painted cups and small Reserved Slip jars, all locally manufactured, could be impressed with a single or double groove with a circle, a wedge motif, a crescent, and a drop motif, probably made by a stick or reed (Figures 5.11–13); sometimes the impression recalls a trefoil design. Marks might have indicated groups of production. Storage jars, and especially grooved-rim jars, present a quite variegated number of signs usually impressed on the shoulder before firing (Figure 5.37): two or three parallel lines, a simple cross, a semicircle, a semicircle with a line, a semicircle with a cross, V motifs inverted, a star, a Y motif, four impressions of reeds forming a square, a ladder-like motif, a fork (Figure 5.22), and a leaf motif (Figure 5.23). Sometimes two marks can be found (Figure 5.26). It is noteworthy that the same mark can be found on different vessels, and that the same mark was also

incised in different positions on similar jars—inside the rim and on the shoulder. A couple of signs could also be incised on the same jar before and after firing. It is also interesting to note that a few cases of grooved-rim and ovoid thickened-rim jars present the same sign; since they belong to different regional circuits of circulation that overlap at Ebla, this can only attest to the production of these vessels in the area of Ebla. This seems to be also confirmed by the two painted cuneiform signs, unfortunately badly preserved and not legible, found on a grooved-rim and an ovoid jar. A further factor of interest, indicating a local traditional manufacture, is that the same signs can be found in jars recovered in the EB III Unit, over which the South Unit of the Central Complex of Royal Palace G was built. The corpus of signs made before firing, and their presence on different jars of different wares and use, attest to a practice developed in the local workshops and that had a long tradition in EB III. They certainly find good comparisons in other Syrian ceramic assemblages of EB III-IV, which confirm the diffusion and fortune of the practice in relation to the growing specialization of pottery production.¹⁵ In the very few cases of marks added after firing, we could assume that they were storage facilities for the accumulative system of the palace. The main problem, however, for the hypothesis of a workshop mark or imprint lies in the fact that not all the jars of the same production (in term of pastes and firing) present the marks, while only a small percentage of the total bulk was marked. One can therefore suggest that only one item, out of a group of production, was marked as an example.

3. VESSELS DISTRIBUTION IN ROYAL PALACE G

The distribution of the various vessels in the different units of the palace seems to be fairly homogeneous.¹⁶ Only a few rooms show distinct concentrations of vessels documenting some functional specialization, which, however, is also supported by other documents. The case of the Great Archive L.2769, with its scarce presence of storage jars, is paradigmatic, as also is the Small Archive L.2712, where, however, many small

containers were kept on upper shelves. Storage rooms in Central Unit North (L.2617, L.2718), West (L.2812, L.3914, L.3926), and South (L.3532, L.3466, L.3500, L.3512) provide the largest selection of classes and forms of vessels; distinct features in the distribution are also notable there. There is a clear differentiation between the long corridor L.2617, presenting tripod and ovoid jars, also impressed, and grooved-rim jars, and the adjacent L.2718, which gave access to it and presents fifty-three goblets arranged in a line, three bowls, and a small painted jar (Figure 5.38). We can assume that the two groups, so well separated in the two rooms, were probably both destined to the same official commensality, which might have included symposia offered to the elites as a form of communal redistribution of food. The jars contained food (grooved-rim jars) and beverages (ovoid jars), and the goblets were used for their distribution; this seems to be supported by the number of goblets and the quantity of liquids contained in the twenty ovoid and tripod jars, which can be estimated as nearly 1,400 liters.

A further distinct case is also offered by L.2890 with its hearths, fireplaces, and corrugated jars (Figure 5.39). The room was certainly a kitchen but of a special kind, not because of the jars (they were quite common in the palace equipment and elsewhere, such as at Hama), but given the quantity of food or products that could be cooked or processed in this room: the nineteen corrugated jars could contain up to 1,000/1,200 liters of foodstuffs.

In the South Unit of the Central Complex a great number of vessels was stored and kept aligned on the benches and stepped shelves (Figure 5.40). Along with the usual set of grooved-rim jars, we find large red-burnished everted-rim globular jars, a tray on a bench with small goblets, and, above a stepped bench, an entire set of miniature goblets vitrified by the fire that destroyed the palace. Also notable is the number of vessels in the most secluded wing of the palace, Central Unit West, south of the Red Temple and west of the hypogeum, where benches, circular ridged installations, deep vats for decanting, pattern-

combed jars, fine ring-burnished jars, and basalt containers confirm the activity of processing foodstuffs, especially olives. Olive stones were in fact collected in large numbers here and their impressions were left on the central bench.

4. THE POTTERY LANDSCAPE OF EBLA: THE MICROREGIONAL HORIZON

The pottery assemblage of Palace G finds comparisons in the few sites of the region of Ebla that have been excavated and that produced pottery of the same period. Many sherds have been collected in surveys of the region, and these offer clear evidence of the regional diffusion of the same wares and forms of vessels. The petrological and chemical analyses conducted on a small amount of sherds from Tell Afis (EB IV levels) and Ebla (Palace G) indicate the same production, clays, pastes, and firing technologies for Simple and Simple fine Wares. Moreover, sampling of clays in the Afis-Ebla territory has also demonstrated that Simple Ware and fine goblets, bowls, storage jars, and the corrugated jars were composed of local clays.¹⁷ The presence of limestone and basaltic inclusions, shown by most of the fragments analyzed, fits well with the geological character of Ebla, founded on a limestone plateau bordered to the south by a basaltic plateau (Abu Duhur -Selimiye).¹⁸ A few samples, such as the blackish Metallic-Burnished Wares, show clays and composition of a non-local origin.

As evidence of kiln areas is lacking at Ebla for this period, and wasters and slags are apparently not visible in the actual deposit inside the city for the EB IV, nor evident anywhere on the surface, the location of workshops and kilns is only a matter of speculation. Kilns of this period are not documented in the region but are instead well known for the post-palace G phase at Tell Afis and Tell Banat on the Euphrates.¹⁹ The quite ephemeral structures investigated at Tell Afis document specialized workshops clustered in a separated quarter of the town as a clearly incipient and experimental stage of industrial manufacture. This area was built over a long sequence of small domestic units

that also included pottery kilns going back to EB III, documenting a clear use of this area for pyrotechnical activities.

In conclusion, the vessels found in Palace G were probably produced in local workshops specialized in the different fabrics and wares for the various vessels and functions. We can suggest the existence of a more centralized and even urban workshop for the more standardized fabrics, the goblets, the small containers, and the ovoid jars. Others, such as the ubiquitous and fragile grooved-rim jars and the globular corrugated jars/pots, fired at lower temperatures and showing a greater variability of textures, could have been produced in specialized workshops in the countryside or outside the circuit of the urban walls, probably fired in more ephemeral and occasional kilns. The whole production was, therefore, the result of pottery specialization resulting gradually in massification and standardization, following a trend that had probably begun earlier and that would only culminate towards the end of the millennium.

5. EBLA AND THE POTTERY LANDSCAPES OF SYRIA: THE MACROREGIONAL HORIZON

The first investigations into the pottery corpus of Palace G were mainly aimed at assessing its relative chronology on the basis of comparisons with the assemblages from some of the few sequences that had been excavated at that time in northwestern Syria, Hama, and a few tells in the Amuq (Hatay Province). Similarities appeared immediately between the materials from levels of Hama J 6-5, well deposited in sealed contexts, and phase I of the Amuq sequence, whose pottery assemblage, fabrics, and wares had been analyzed in an exemplary way.²⁰ At the same time, the prevailing presence of distinct standardized forms directed further comparisons towards the "caliciform" tradition of the EB IV sequence of northern Palestine.²¹ Moreover, the identification of two different and subsequent traditions of pottery production at Ebla in the palace and the post-palace layers

allowed a distinction of the Caliciform Ware from Ebla between EB IVA and EB IVB phases.

The excavations carried out in the 1970s and 1980s in the Tabqa Dam area on the Euphrates (Tell es-Sweyhat, Tell Hadidi, Tell Selenkahiye, Tell Halawa, Tell Munbaqat) provided further sequences and corpora of materials with which to define more precisely both the relative chronology and the geographical horizon of the pottery tradition to which the Ebla palace assemblage could be attributed. The spatial and temporal dimensions were, in fact, intertwined factors in the characterization of the pottery production of the palace. Comparisons of both factors made it possible to delineate a pottery province of Ebla that substantially matched the extension of the economic aggregation and administrative control by the central institution (the Palace).²² This was clearly not a political space but an area of use, circulation, and accumulation of food, and of diffusion of the related practices of storage and processing of food and beverages: that is, the area where distinct fabrics were manufactured to this end. Pottery production followed the same dynamics of regulation and growth as the producing societies, and the resulting regional distribution or pottery province was thus coherent with their economic organization. Administrative control and economic centralization resulted, in fact, in an organization and formalization of cultural spaces; consequently, ceramic zones responded to the regional orientation of the producing workshops towards the consuming centers.

The publication of the pottery assemblages of important cemeteries in the Tabqa Dam region²³ and a few important sites,²⁴ and new evidence from the Karkemish Dam area²⁵ and eastern steppes²⁶ have now substantially improved our knowledge and identification of the pottery provinces. It is now clear that the Euphrates had a distinct regional and chronological dimension, with trends towards standardization and massification, that had begun earlier and a lengthy duration marked by the production of special wares and shapes for symbolic and funerary use. Distinct characteristics can also

be found in the steppes from Umm el-Marra to Al-Rawda, mirroring their own trajectories of economic aggregation and social affiliation.

The spatial dimension of the pottery production in Syria in the period of Palace G, or, more precisely, the last years of its life, was characterized, despite the overwhelming aspect of standardization of a few vessels and fabrics, by a plurality of regional loci of manufacture, certainly interrelated and sharing technological processes and formal repertoires. A more or less extensive area can be recognized (coastal, Orontic, inland north and inland south, steppe region, Euphratean, Jezirah West, Jezirah East).²⁷ Whether the smaller productive landscapes or microregional pottery horizons might have corresponded to the area of the main individual centers with their hinterland, distinct environmental features and related adaptive strategies, and whether the larger productive landscapes or macroregional horizons corresponded to the area marked by greater economic and social interplay patronized by central institutions is certainly open to debate, speculation and further research.²⁸

NOTES

- 1 For an initial evaluation and analysis of the materials see Matthiae (1977, 94–106; 1989a, 113–25; 2010b, 182–88) and Mazzoni (1982; 1985a; 1985b; 1988; 1994a; 2003). Forty-six vessels were exhibited in Rome and Trieste: see Matthiae, Pinnock, and Scandone Matthiae (1995, 360–62, 369–79, 383, nos. 167–211, 221).
- 2 See Mazzoni (2002, 76), and the proposal of two phases IVA1 and IVA2 (destruction level of the palace).
- 3 For the radiographic analysis of a goblet showing the use of the wheel, see Laneri (2009, 85–86, fig. 22).
- 4 As rightly pointed out by Kontani (1995). See relevant comparisons in some of the handled tankards from Gedikli Karahöyük in Duru (2010, 58–59, 148, fig. 23, plates 58.5–6, 132/2–3). See also Mallegni and Vacca (in press).
- 5 Comparisons with the pan of Tell Ahmar in Mazzoni (1985b, 566–67, figs. 1.21, 2.8). On the diffusion of this class of pans with omphalos and long handle, see Mazzoni (2000a, 407, figs. 22–23). The metal pans

- date from the EBA to MBA and are of Anatolian production; they were well diffused in the Cappadocian period in Kültepe, Ashur and Ebla. To the list I gave in 2000 we can add the pans from Kültepe: see Emre (2008). Despite the presence of these MB I examples, Hockmann (2010, 61, plate 60) attributes the Ashur types to the Early Dynastic-Akkadian period.
- 6 See Mazzoni (1994, 250). The volumes have been calculated following the method of the “summed cylinders”: see Rice (1987, 220–22). The volumes of the complete items have been calculated first on the basis of their drawings, and then by filling them with water. Calculations, drawings, and useful comments on the methods of measurements and clustering of volumes have been provided by Martelli.
 - 7 Following X-ray analyses of a grooved-rim jar from Palace G: see Laneri (2009, 95–98, fig. 28).
 - 8 This is the class of reddish-orange mineral-tempered ware often incised with wavy parallel lines in the form of the collared everted-rim jar: see Duru (2010, 146–47, plates 121–22, 51:159 bottom).
 - 9 To the technical consideration put forward by Mazzoni (1993), we can add the results of the analyses carried out by Graff (2012) on materials of this class from Tell Qarqur. Cooper (2006a, 183) has also noted that most of the EB Euphrates cooking pots “were tempered with calcite, a mineral inclusion well known for its thermodynamic suitability.”
 - 10 See among others: Peltenburg (1997, 138–39, 144), de Miroschedji (1997, 191–92), Flender (2000, 304–5), Joffe (2001), Wengrow (2008), Mazzoni (2009, 44).
 - 11 Motifs such as the rosette, the serpent, and the quadruple-spiral, animals such as the frog, the lizard, the turtle, and the scorpion, and the squatting woman were images associated with fertility: see Mazzoni (1992, 41–42; 2002). De Miroschedji (1997, 199–205) has interpreted the repertory of the “rituel syrien” as the dancing figures and the “rencontre” between men and probably a goddess, and a scene of sexual intercourse as evocative of rituals of fertility and a religious sphere. See also de Miroschedji (2011).
 - 12 For a new list of references and new additions, see Mazzoni 2013, 193–95. To this list, and particularly for inner Syria, I can now add an impression from Tell es-Sur (Al-Maqdissi and Ishaq 2012, fig. 3a), three impressions from Umm el-Marra (Schwartz et al. 2012, 171–73, figs. 17–18), and five impressions on the rims of the grooved jars from EB IVB HH temple at Ebla (Sala, pers. comm.).
 - 13 For a detailed presentation of the evidence, see Mazzoni (1993). The four jars were TM.89.G.383/1 (impression A41: hearth 4), TM.89.G.395/1 (impression A44: hearth 3), 393/1 (impression A42: hearth 1), and 394/1 (impression A 43: hearth 2). The fireplaces and hearths were eight, numbered from south to north. The other jars were spread on the floor: TM.89.G.398/1, a swollen rim-collared jar, was found in front of hearths 7 and 8; it was opened and contained a tarry substance. A similar jar, 397/1, was spread in front of the hearths 5 and 6.
 - 14 It is also a matter of speculation as to whether animal or vegetal fats could be processed, as I proposed in the case of L.2890. All the walls over the hearths and the fireplaces were in fact blackened in a very distinct way and had a bituminous sticky appearance. The floor at the base of the bench with the hearths sloped towards the bench in a canal-like depression to collect the spilling from the jars.
 - 15 See for comparisons Mazzoni (1988, 89–90 and table 3). Identical marks are documented at Al-Rawda (Castel et al. 2008, fig. 18: RW1.4224.2). A quite similar repertory is also known in the Euphrates region: for some examples, see Selenkahiye (Schwartz 2001, plates 5A.8c, 5A.12c, 5A.17e, 5A.19b-d, 5A.25e-f, 5A.28c). For the simple grooves on goblets, see Werner (2008, plate 18:4991). For the pottery marks at Tell Munbqa, see Czichon (2008, 333–62). For the function of pottery marks, see Genz (2001; 2002, 109–17).
 - 16 The tables of distribution published in Mazzoni (1994) offer an exhaustive picture of the materials found and restored up to that date; the pottery found since then and the progress of the restoration on the jars do not alter significantly those conclusions.
 - 17 A group of forty thin sections have been sampled for diffractometric and chemical by XRF analyses by Lazzarini and Colombo (1995) and compared to the local marly illitic-montmorillonitic clay.
 - 18 See *ibidem* 1995, 21. See the geological map of the area and description in Lazzarini (1998, 482–83, fig. 1).
 - 19 For Tell Afis see Mazzoni and Felli (2007), Felli and Merluzzi (2008). For Tell Banat and the Euphrates area and for an analysis of the production units at Tell es-Sweyhat, Tell Habuba Kebira, and Halawa Tell A, see Cooper (2006a, 183–98). The potter’s quarter at

- Tell Leilan was specialized in the production of standardized bowls (sila bowls) (Senior and Weiss 1992, 16–23; Weiss 1993, 46). An extramural pottery kiln area is documented at Lidar Höyük (Hauptmann 1993).
- 20 See the notes by Matson (in Braidwood and Braidwood 1960, especially 397–419) for Phase I to which Palace G has been correlated.
 - 21 The definition of EB IVA-B was first proposed by Matthiae (1975, 350n34). See also Matthiae (1977, 47, 102–6) and Mazzoni (1985a, 14–15).
 - 22 Mazzoni 1985b. See criticisms in Carter and Parker 1995. In Mazzoni 2000b I confirmed that ceramic provinces and social and economic aggregations were shaped according to a coherent organization of the territory; a general correspondence between geopolitical systems, cultural units, and ceramic provinces has been also proposed by Milano and Rova (2000). Regional analyses for the Early Bronze Age have also been formulated by Thissen (1989), Jamieson (1993), Rova (1996), Milano and Rova (2000), and Engin (2007).
 - 23 Tawi (Kampschulte and Orthmann 1984), Wreide (Orthmann and Rova 1991), Samseddin and Jerniye (Meyer 1991), Abu Hamad (Farb et al. 2005), Selenkahiye (van Loon and Meijer 2001; see especially 251–54 and correlation of Early Selenkahiye with Palace G horizon).
 - 24 See especially Tell Hammam et-Turkman and the correlation of strata VI: 1–4 with Palace G proposed by Curvers (1988, 381–82). The corrugated jars from Tell Bia/Tuttul Palast B, Hof 5, southern Hall might be imported from Ebla (Strommenger and Kohlmeyer 2000, 25–26, plates 32–33:40.1, 5).
 - 25 See the fundamental analysis and periodization of the EB Euphrates pottery horizon by Porter (2007). The synthetic evaluation of Cooper (2006a, 8–26) is based on Porter's periodization. See further materials and relative discussions for defining a pottery province in the area of Karkemish in Peltenburg 2007 by Kepinski (2007), Marro (2007), Sertok (2007), Sconzo (2007), and Engin (2007).
 - 26 Umm el-Marra (Schwartz et al. 2006; Schwartz et al. 2012); Al-Rawda (Castel et al. 2008).
 - 27 The periodization of the Jezirah pottery horizon proposed among others by Elena Rova in the framework of the ARCANE project might allow comparisons between the Palace G pottery assemblage and the corpus of materials of EJZ4a western Jezirah: see Rova (2011, 61–64).
 - 28 See different approaches and conclusions for the Upper Euphrates in Wattenmaker (1998, 200–05) and Cooper (2006a, 202–05).

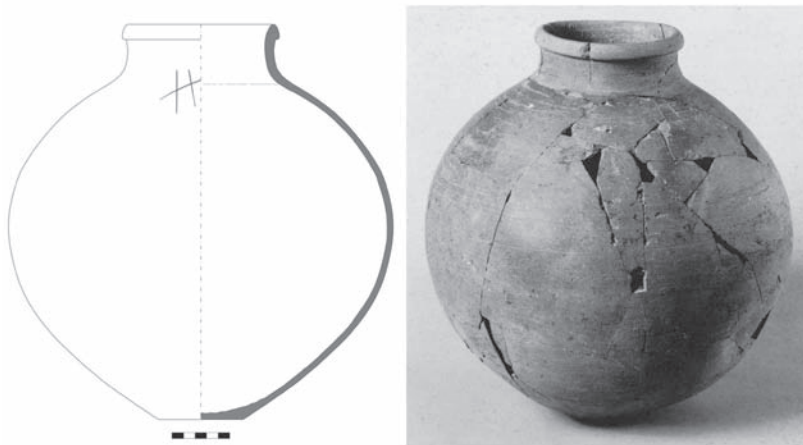


Figure 5.1. Burnished Metallic ware jar, TM.83.G.441/1 (L.3464a) (after Matthiae, Pinnock, and Scandone Matthiae 1995, 375, no. 273).



Figure 5.2. Burnished Metallic Syrian Bottle, TM.76.G.900/100 (after Matthiae, Pinnock, and Scandone Matthiae 1995, 371, no. 191).

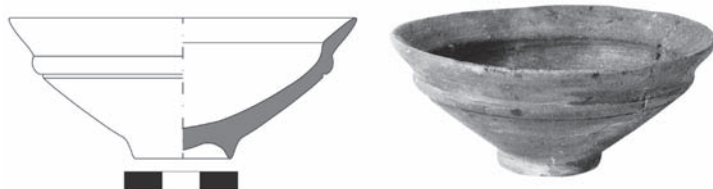


Figure 5.3. Everted rim bowl, TM.83.G.106/13 (L.3512).

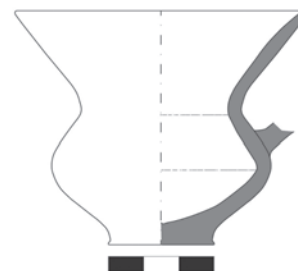


Figure 5.4. Imported tankard, TM.83.G.106/19 (L.3612).

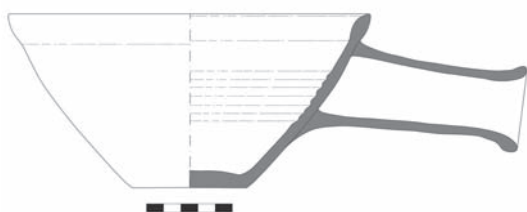


Figure 5.5. Imported pan with long handle, TM.83.G.106/2 (L.3512).



Figure 5.6. Deep bowl, TM.83.G.56/1 (L.3500).



Figure 5.7. Painted Syrian Bottle, TM.83.G.445/1 (L.3463a).

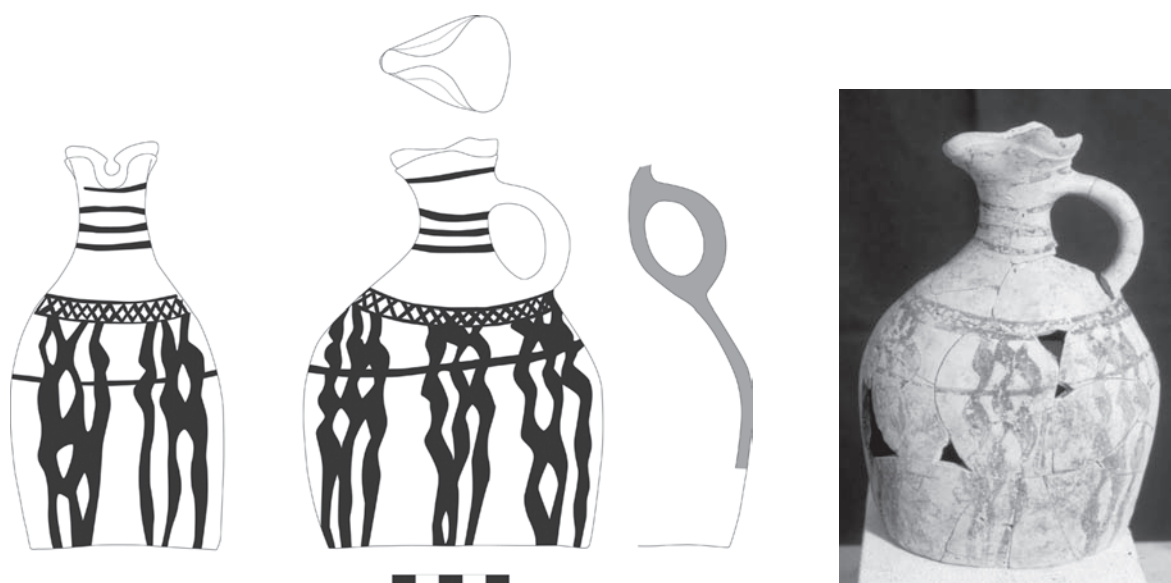


Figure 5.8. Trefoil mouth pitcher, TM.75.G.189/6 (L.2712).

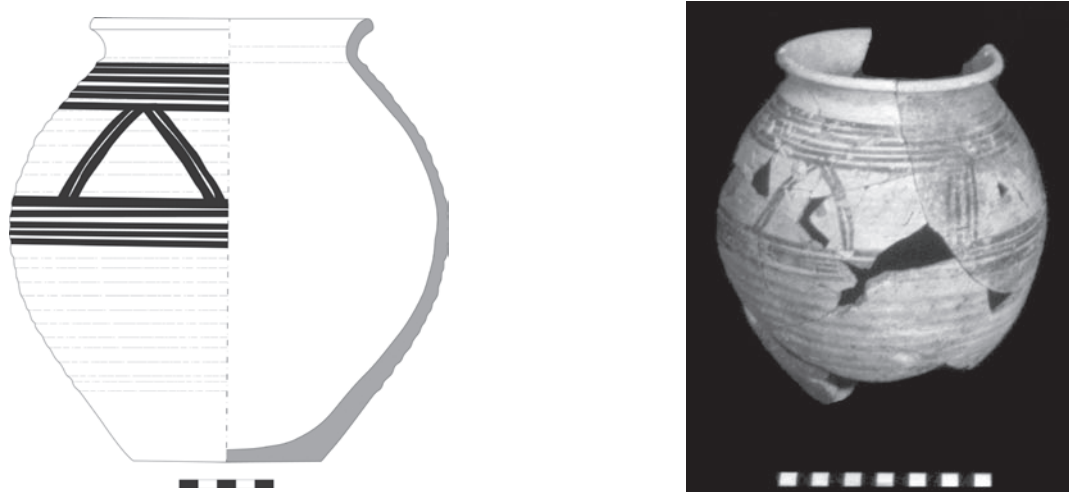


Figure 5.9. Painted jar, TM.83.G.31/2 (L.3500).



Figure 5.10. Painted lid, TM.88.G.329/1 (L.4448) (after Matthiae, Pinnock, and Scandone Matthiae 1995, 373, no. 201).

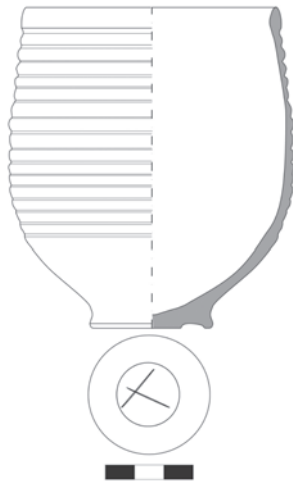


Figure 5.11. Corrugated goblet with pottery mark on its base, TM.83.G.106/5 (L.3512).

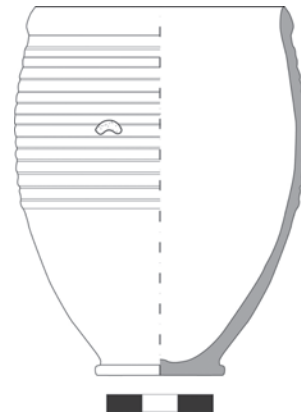


Figure 5.12. Corrugated goblet with pottery mark over the corrugations, TM.83.G.63/13 (L.3500).

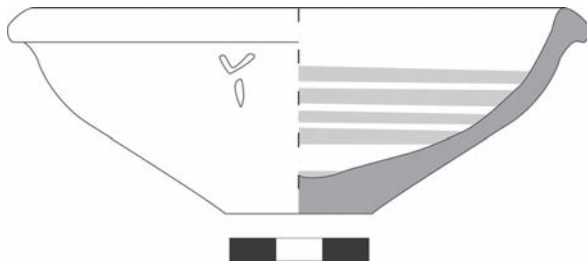


Figure 5.13. Bowl with pottery mark below the rim, TM.83.G.63/3 (L.3500).

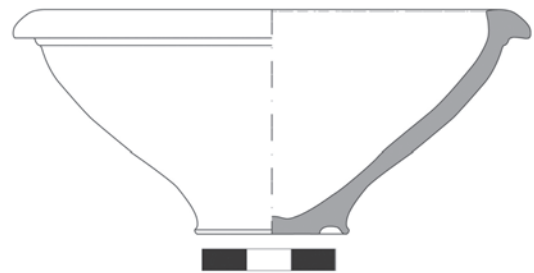


Figure 5.14. Bowl, TM.83.G.106/16 (L.3512).

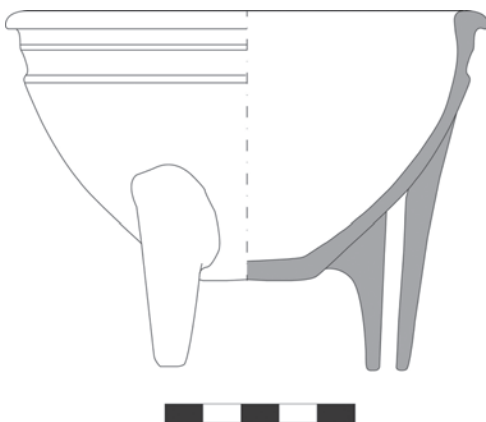


Figure 5.15. Tripod bowl, TM.82.G.511/1 (L.3463).



Figure 5.16. Miniature goblets, TM.83.G.470 (L.3532).



Figure 5.17. Spouted small jar, TM.83.G.106/20 (L.3512) (after Matthiae, Pinnock, and Scandone Matthiae 1995, 372, no. 196).

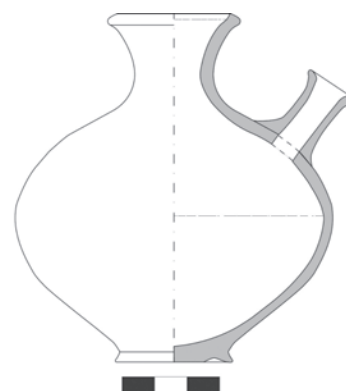


Figure 5.18. Spouted small jar, TM.83.G.470/2 (L.3532).

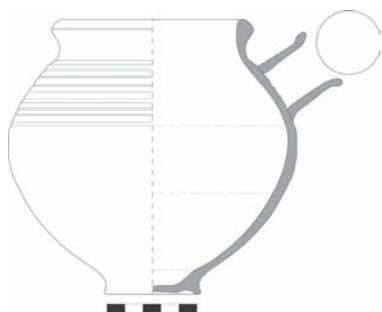


Figure 5.19. Teapot, TM.82.G.511/14 (L.3463) (after Matthiae, Pinnock, and Scandone Matthiae 1995, 375, no. 204).



Figure 5.20. Jar, TM.83.G.104/1 (L.3512) (after Matthiae, Pinnock, and Scandone Matthiae 1995, 374, no. 202).

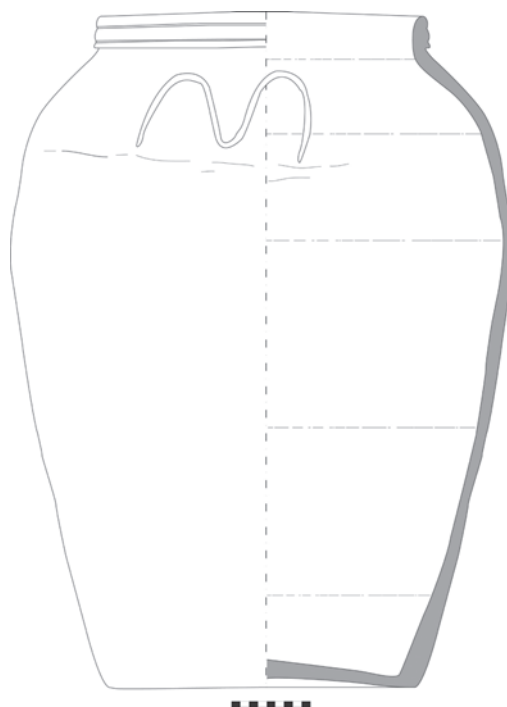
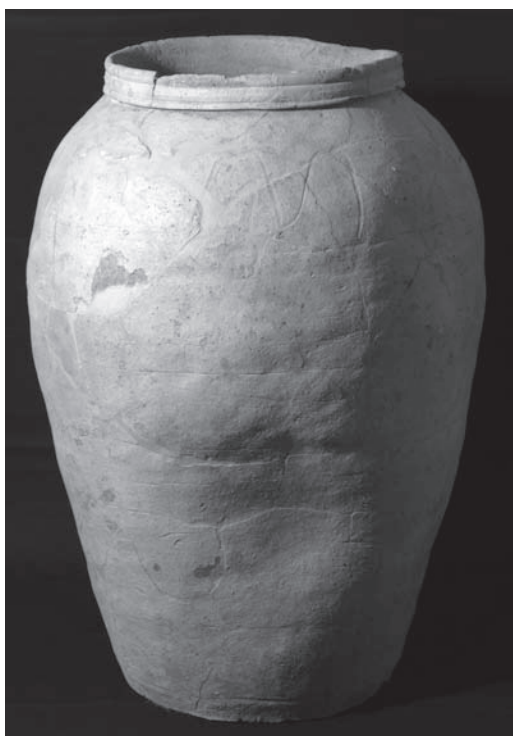


Figure 5.21. Jar, TM.83.G.100/1 (L.3512).

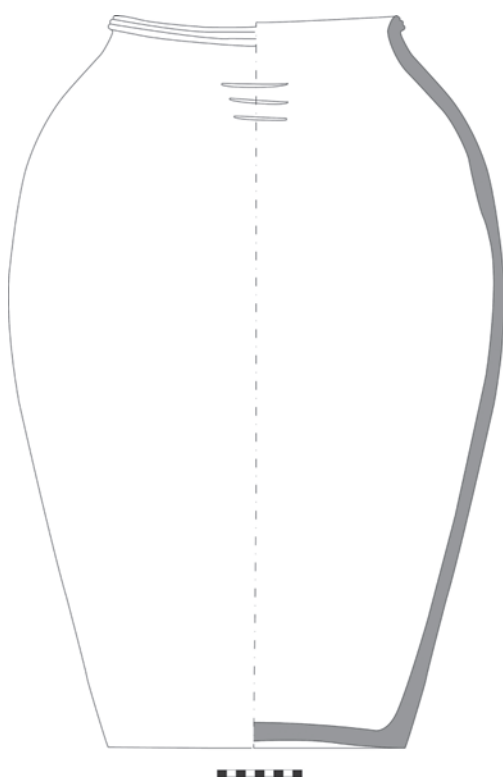


Figure 5.22. Jar, TM.83.G.28/1 (L.3500).

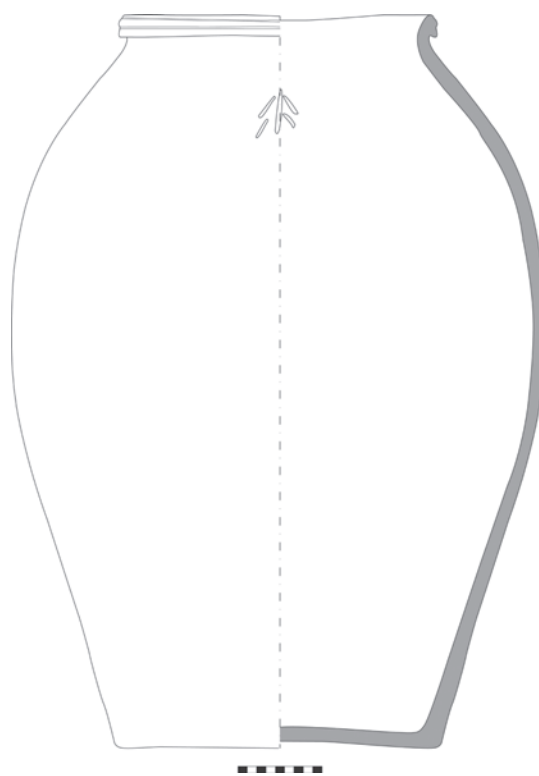


Figure 5.23. Jar, TM.83.G.40/1 (L.3500).



Figure 5.24. Jar incised with the head of a lion, TM.88.G.318/1 (L.4430).

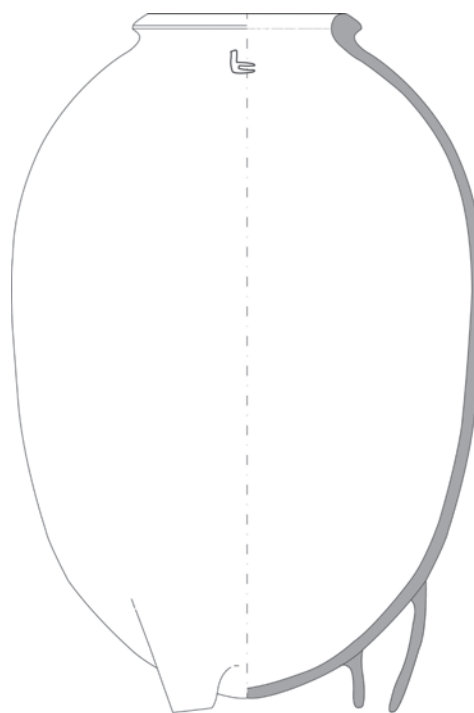


Figure 5.25. Ovoid jar, TM.75.G.265/2 (L.2617).

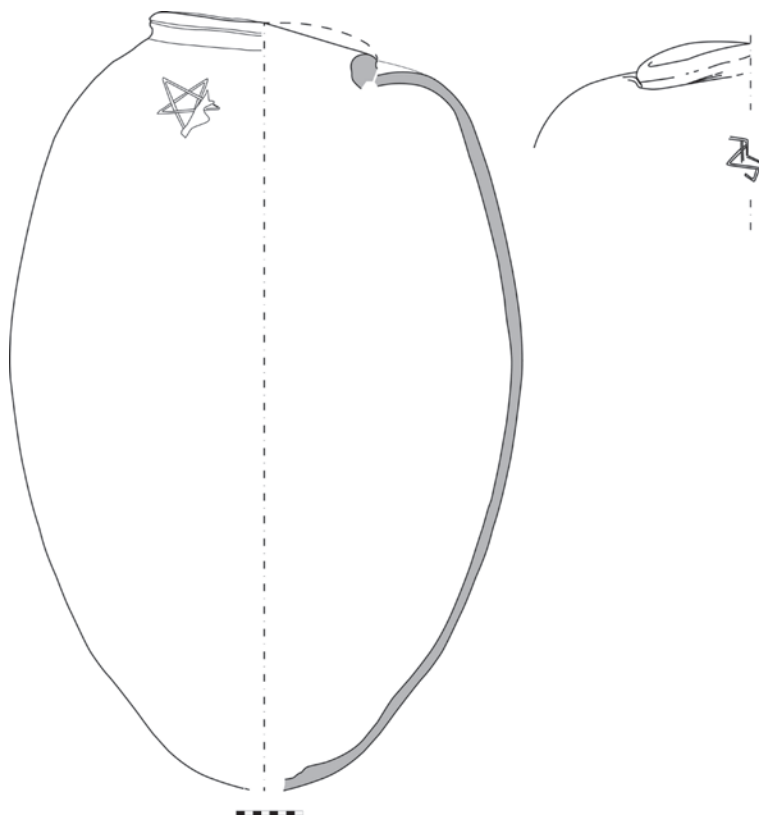


Figure 5.26. Ovoid jar, TM.82.G.506/1 (L.3464).

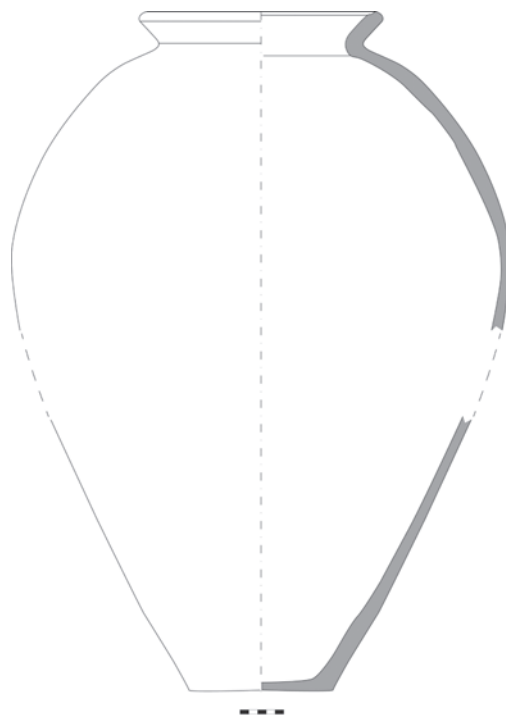
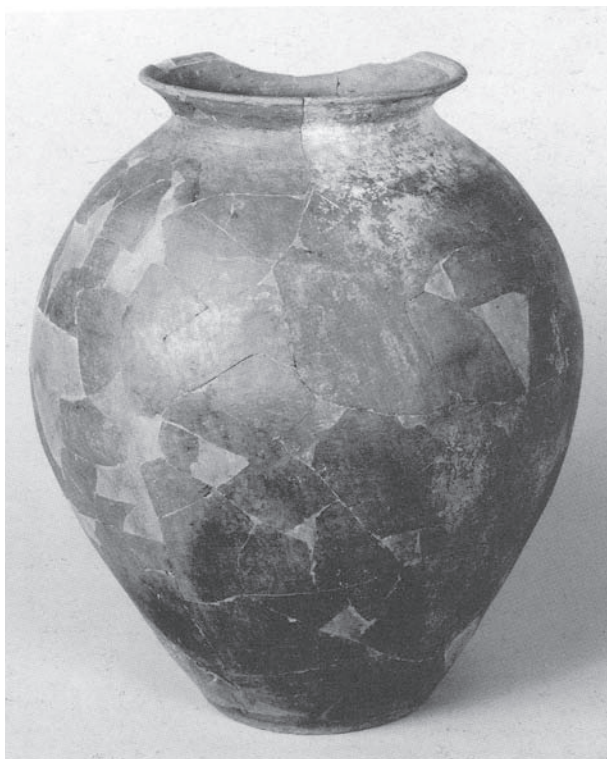


Figure 5.27. Brown and Red Burnished jar with everted rim, TM.85.G.387/1 (L.2812) (after Matthiae, Pinnock, and Scandone Matthiae 1995, 377, no. 207).



Figure 5.28. Ovoid grooved jar, collared with banded rim, TM.89.G.397/1 (L.2890) (after Matthiae, Pinnock, and Scandone Matthiae 1995, 377, no. 208).



Figure 5.29. Ovoid grooved jar, collared with banded rim, TM.89.G.383/1 (L.2890).

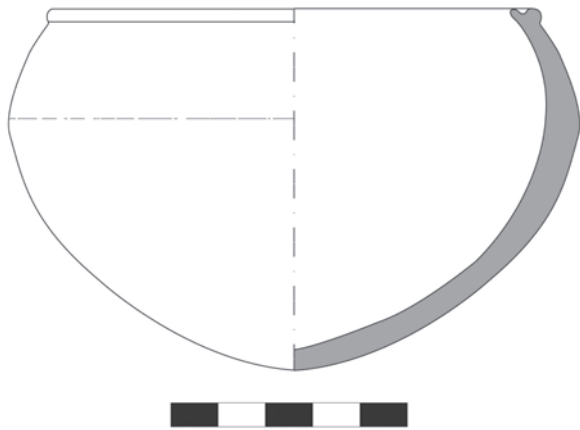


Figure 5.30. Small cooking pot, TM.85.G.106/23 (L.3512).



Figure 5.31. Incense burner, TM.82.G.538/3 (L.3464).

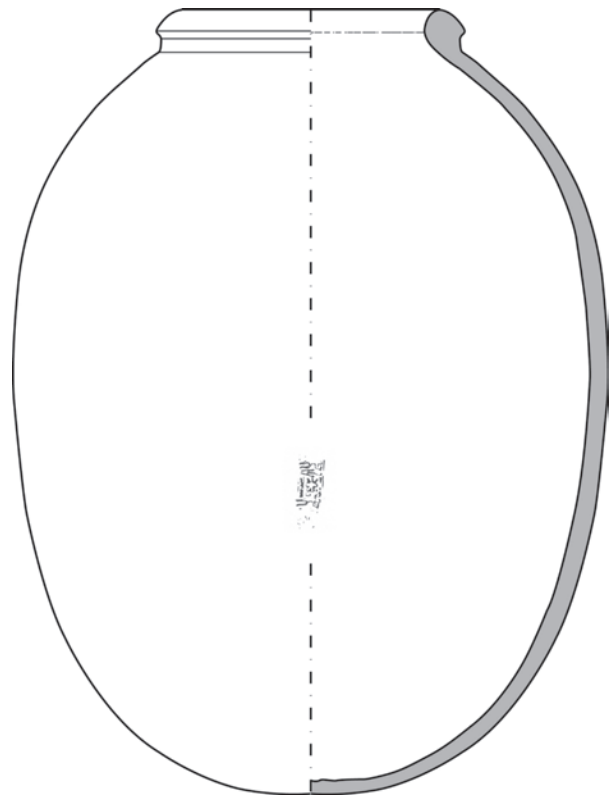
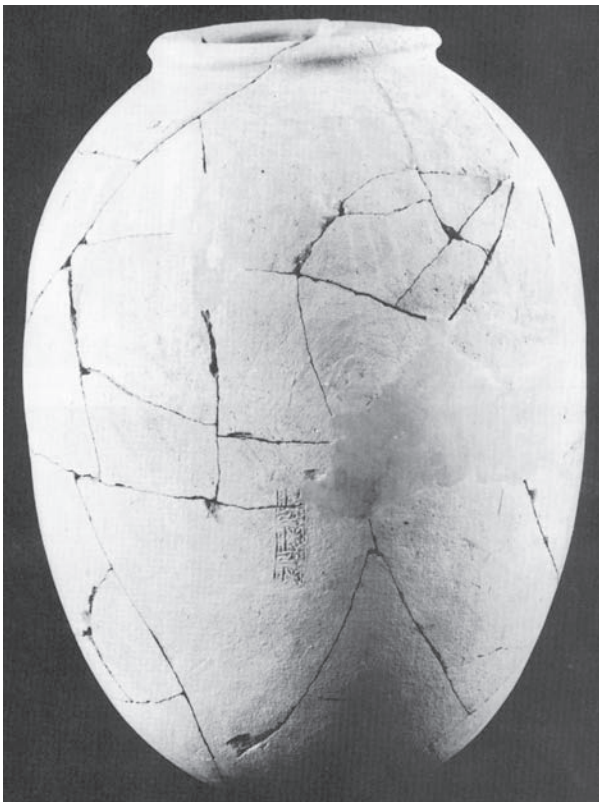


Figure 5.32. Ovoid jar (TM.75.G.280/22) with impression of cylinder seal (A16), from L.2617 (after Matthiae, Pinnock, and Scandone Matthiae 1995, 379, no. 211).



Figure 5.33. Tripod ovoid jar (TM.75.G.280/24) with impression of cylinder seal (A17), from L.2617.



Figure 5.34. Fragment of corrugated jars (TM.83.G.518/3) with impression of cylinder seal on the rim, (A28), from L.3532.

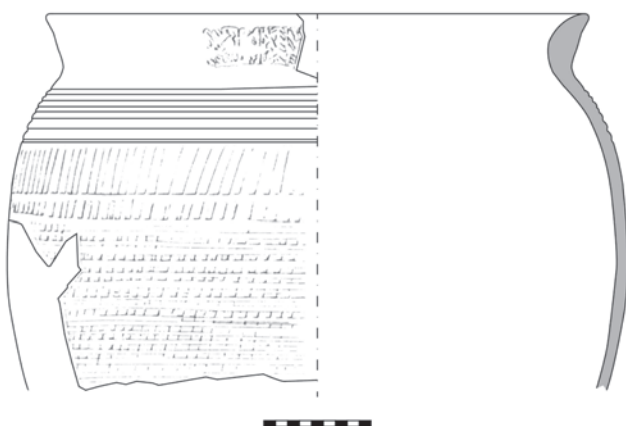


Figure 5.35. TM.89.G.395/1, with impression (A44), from L.2890 (after Matthiae, Pinnock, and Scandone Matthiae 1995, 383, no. 221).



Figure 5.36. Ovoid grooved jar, TM.89.G.383/1, and impression (A41) inside hearth 4 (L.2890).

EB IVA			L.3518	L.3911 L.3926 (2) L.3932						
			L.3464 L.3500 (3)		L.3463	L.2512 (TP)				
			L.3926			L.3464	L.3512			
	L.2617		L.3500				L.2712			L.3932
	L.2617								L.3926 L.3466	
	L.3466 (ups. down)	L.3500		L.3911	L.3911 L.2877	(2) L.3500		L.2617 L.2877 L.2712 L.3532 (2) L.3500		L.3532
EB III					L.3470					
	L.3530									

Figure 5.37. Pottery marks on the storage jars from Palace G and the EB III building below the South Unit of the Central Complex.



Figure 5.38. Ebla, Royal Palace G (EB IVA), plan of the Central Unit North and Central Unit West.



Figure 5.39. Ebla, Royal Palace G (EB IVA), plan of L.2890 and L.2834.

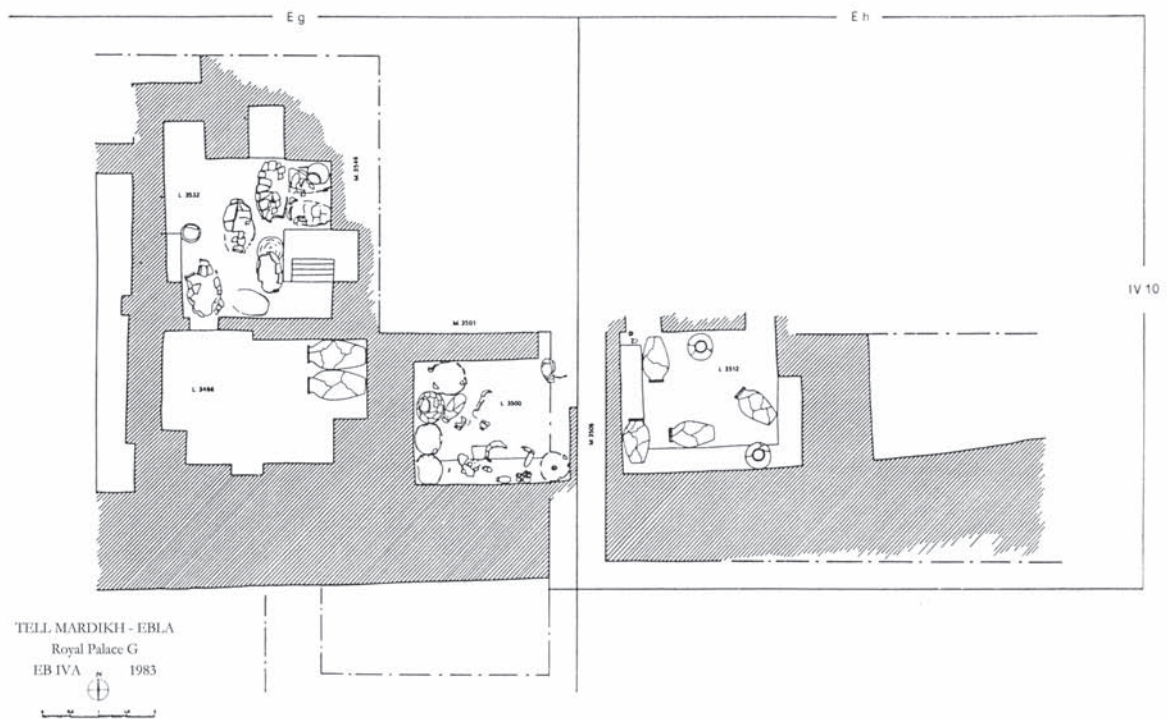


Figure 5.40. Ebla, Royal Palace G (EB IVA), plan of the South Unit.

CHAPTER 6

FORM AND CONTENT

A Preliminary Functional Interpretation of the Storage Jars from Royal Palace G

M. D'Andrea and A. Vacca

1. STORAGE VESSELS FROM ROYAL PALACE G: PREVIOUS STUDIES AND RESEARCH ISSUES¹

An overall description of storage vessels from Ebla's Royal Palace G, from both a typological and a functional point of view, was outlined since the early 1980s by Stefania Mazzoni in her preliminary classificatory essay of the Palace's ceramic repertoire. In this study, a first basic differentiation was established in terms of function, combining size and macroscopic observations on fabrics, between vessels devoted to the preservation of liquids and solids. Further studies carried out by Mazzoni analyzed aspects related to the function and distribution of such vessels, the relationship with the organization of the manufacturing process, the administrative practices (such as sealing), and, finally, the geographical distribution within the ceramic provinces of Syria during Early Bronze IVA (Mazzoni 1982; 1985a; 1985b; 1988; 1992; 1994a, 251–53; 2002a, 77–78; 2003; Matthiae 1995a, 113–25; 2010b, 183–88. See also Mazzoni, in this volume).

Although continued archaeological research at the site and on its ceramic materials has not substantially challenged these results, some aspects could be further refined. The present contribution is a first step of a detailed study focused on the analysis of storage vessels within the assemblage of Royal Palace G. The choice of this case study was suggested by the large

number of specimens retrieved, in particular for grooved-rim jars, which could allow a statistical estimate of both macroscopic and microscopic observations. Based on the analysis of a relatively large sample of sherds (chemical and petrographic characterization, technological features of the manufacturing processes), and a comparison with the textual evidence from Royal Archives, we propose some considerations on the function of these vessels and the socioeconomic organization of their production.

2. TYPOLOGY AND DISTRIBUTION ANALYSIS

Closed shapes such as jars, intended for daily use or for the storage and preservation of solid and liquid products, are largely present in the pottery assemblage of Royal Palace G and pertain to different types, sizes, and wares. Medium and medium-large-size jars are produced in Simple Ware (even with combed decoration or reserved slip surface treatment) and in a hard, well-fired fabric that imitates the Metallic Ware (Mazzoni 1994a, figs. 8–10 and Mazzoni, in this volume). The volume of such jars ranges approximately from 10 to 30 liters.² Large storage jars or *pithoi* (with capacities of more than 30 liters), have been arranged in several categories within this study:

1. Types 1–3 (jars with flat-based body and grooved rim, [Figures 6.1–5](#); [Plate 10:1–2](#));

2. Type 4 (jars with ovoid body, swollen rim, and tripod or rounded bottom [Figure 6.6:1–2](#); Plate 10:3–4);
3. Type 5 (jars with thickened outside and rounded rim [Figure 6.6:3](#)).³

The distribution of the jars volumes on the graph ([Figure 6.12](#))⁴ highlights two main concentrations: one between 31 and 50 liters, the other between 108 and 126 liters. An apparently random distribution of a few measures is noticeable between the two concentrations: these could pertain to a third, intermediate magnitude, although available measures are not yet sufficient to support this interpretation.

Volume concentrations seem to be consistent with the typological classification. Type 3.b vessels have the lowest capacity, and are attested only in the first concentration (31–50 liters). Type 1, 2 and 3.a jars have the largest capacity, being included (and exclusive to) the second concentration (108–126 liters). Type 4 jars (both varieties a and b) are not included into a single concentration, being spread over the whole distribution (on this topic see also the analysis on storage jars from Building P4, led by Marchetti and Nigro 1995-1996, 13).

2.1. Grooved-Rim Jars (Types 1–3)

The most common and widespread category, among Royal Place G pottery assemblage, is the grooved-rim jar, which shows a wide variety of rim and body shapes. Among grooved-rim jars, three main types could be detected on the base of both morphological and manufacturing observations (see also § 4). Type 1 jar is characterized by an ovoid body, with flat base, and vertical rim (type 1, [Figures 6.1–2](#)). Different modeling techniques determine significant formal variability: hand-coiled bodies show irregular surfaces, while rims show a wide range of inclinations, from slightly everted to slightly inturned. Five complete jars pertaining to type 1 show similar dimensions, with a height ranging from about 70 to 80 centimeters and a volume ranging from 80 to 110 liters;⁵ this seems to be the main element of standardization. Several jars bear potter's marks incised on the shoulder, some of which

are not exclusive to these shapes but recur also on other types of storage jars (Mazzoni 1988, 88, table 3; Mazzoni, in this volume). Type 1 jars could be found in all the rooms of Royal Palace G, with relevant concentrations in the storage rooms of the South Unit (L.3464, L.3500), in storeroom L.2764, and in different rooms of the West Unit of the Central Complex ([Figure 6.7](#)). Several samples come also from Building P4, Area P South (Marchetti, in this volume, [Figures 7.24:35, 7.29:32, 7.32:31, 33–34](#)).

Type 2 jars includes shapes with ovoid body, slightly everted and molded rims, with a single shallow groove (type 2, [Figure 6.3](#)). Two complete jars of this type measure 70 and 75 centimeters in height, and have a volume of about 106 and 108 liters respectively ([Figures 6.3:4 and 6.3:5](#)). Type 2 is numerically less significant than type 1 ([Figure 6.7](#)).

Type 3 jars are characterized by an ovoid body with more or less bloated shape, tapered towards the bottom, and triangular grooved rims, vertical or slightly everted. The definition of two varieties (3.a and 3.b) is based upon stylistic features: variety 3.a has no decorations, while variety 3.b shows incised decorations⁶ on the outer surface, represented by wavy motifs, in some cases alternated with horizontal lines.⁷ Both varieties can have a potter's mark incised on the shoulders. Type 3 is frequently attested in the rooms of Royal Palace G, and frequently found in association with jars of type 1 ([Figure 6.7](#)). Two complete vessels pertaining to type 3.a ([Figures 6.4:8 and 6.4:9](#)) have a volume of 101 liters and 120 liters respectively, while two complete jars of type 3.b have a volume of 33 liters ([Figure 6.5:10](#)) and 66.19 liters ([Figure 6.5:9](#)). This jar type is also attested, with several samples, among Building P4 pottery assemblage (Marchetti, in this volume, [Figures 7.24:36 and 7.29:28, 31](#)).

Grooved-rim jars (types 1–3) show an ubiquitous distribution in Royal Palace G. At the time of the destruction of the Palace, a total of 254 vessels⁸ was present inside its rooms, with a significant concentration in the storerooms L.2617+L.2716 of the Northern Quarter (sixteen samples) and in

the storerooms of the South Unit of the Central Complex (seventy-four samples). Grooved-rim jars are indifferently present in rooms or sectors of the palace with differentiated functions, and probably they were used for different purposes: in room L.2834 five grooved-rim jars were inserted inside benches (probably employed as containers for ingredients used in the adjacent kitchen L.2890, [Figures 6.1:1](#) and [6.2:8](#)), and one more was sunken into the threshold;⁹ in the West Unit (which appears to have been mainly devoted to grinding activities) the analyzed content of grooved-rim jars revealed the presence of cereals (Wachter-Sarkady, in this volume, [Figure 6.1:2](#)). Those data argue for the possibility that grooved-rim jars were multifunctional containers, both for liquid and solid products.

As already noted by Mazzoni (2002a, 77), the grooved-rim storage jars have a strong regional character, being attested mostly in central inner Syria, in an area between the Idlib, Tell Afis, and Quweiq plains and the Hama region. Type 1 is the most common shape of preservation vessels within the assemblage of Royal Palace G; similar jars are documented at Tell Mastuma in layers c–g of Square 15Gc (Tsuneki 2009a, 81, fig. 3.22.6), at Tell Munbatah and Tell Sabha (de Maigret 1974, 284, figs. 10:89–90; 14, 171), Tell Rifaat (Matthers et al. 1978, fig. 10:52) on the Quweiq River, and at Tell Afis (Mazzoni 2003, 186). Type 3 is comparable with specimens found in dwellings of Hama J 6–5 phases (Fugmann 1958, fig. 75, 3D844 no. 7),¹⁰ at Tell Mastuma in the North Trench, Level XI and in Square 15Gc, Levels c–g (Wakita 2009, 68, fig. 3.9.17; Tsuneki 2009a, 81, fig. 3.22.4), at Al-Rawda (where two specimens, one of which complete, have been found in the first occupation levels, EB IVA),¹¹ and at Tell Munbatah, from surface collection (de Maigret 1974, 284, fig. 10:91). The geographical pattern of distribution of type 1 grooved-rim jars at Ebla itself, and in sites next to Ebla (comprised in the Eblaite *chora*, such as Tell Mastuma, Tell Afis, Tell Sabha and Munbatah) should indicate a local production and circulation of this type. Grooved rim jars were probably manufactured in specialized workshops within the Ebla territory. Differently, type 3 is attested both in sites nearby

Ebla, and in sites not immediately comprised in the *chora* of Ebla (such as Hama), testifying the existence of models and technological features that were commonly adopted over a wider area (corresponding to central inner Syria). Moreover, the presence of this type in different kinds of contexts, both private and public, should indicate differentiated circuits of distribution of the potters' production: both for the private sector, and commissioned by the central authority, that would have commanded a large number of vessels.

2.2. Jars with Ovoid Body, Swollen Rim, and Tripod or Rounded Bottom (Types 4.a-b)

Type 4 jars ([Figure 6.6](#)), with ovoid bodies, swollen rims, and rounded (variety 4.a) or tripod bottoms (variety 4.b) have been extensively studied by Mazzoni, who analyzed their pattern of distribution in Royal Palace G, and the recurrence of cylinder seals and potter's marks on the outer surfaces of the vessels (Mazzoni 1982; 1992). The volume of these jars averagely fits inside four dimensional categories, corresponding to quantities of 52, 66, 74 and 82 liters (Milano 1996, 146). Tripod ovoid jars (variety 4.b) were found only in rooms L.2617 (19 samples), and L.2812 (one sample) inside Royal Palace G. In particular, in the storeroom L.2617, tripod jars were empty, lain on their side and stacked, on three horizontal rows, against the wall in the back of the room (Mazzoni 1982, 152). On the contrary variety 4.a occurs in different rooms of the Palace; a total of thirty-one exemplars was retrieved ([Figure 6.7](#)). Similar exemplars have been found also in Building P4 (see Marchetti, in this volume, [Figure 7.33:40](#)).

Comparisons proposed for type 4 jars¹² points to a prevailing distribution of this shape in the eastern and northern sides of the region from Tell Mardikh to the Euphrates, including the Quweiq river, while south of Ebla this type is totally absent in the archaeological record (Mazzoni 1985b, 564). The distributional pattern and the percentage of attestations, in particular for tripod ovoid jars, along the Euphrates, might indicate the origin of the type from this area (Mazzoni, in this volume). At least for tripod ovoid jars, their

location in the storeroom L.2617 may support the hypothesis that these jars, once emptied of their content, were no more utilized and stored in a point hardly accessible. In general, the limited number of type 4 jars (a total of fifty-one exemplars attested at the time of destruction) may indicate a specialized function of these containers, probably imported with their contents (likely to be oil or wine, see § 5) from the Euphrates area.

3. GROUPS OF FABRICS AND PETROGRAPHIC DESCRIPTION

The definition of different groups of fabrics was based on the firsthand observation of a sample of forty sherds, pertaining both to grooved-rim jars and ovoid jars with swollen rim. The analysis was articulated into two phases. A first macroscopic subdivision of different classes of fabrics was established according to a visual analysis of physical properties: color, texture, size, and frequency of inclusions. Ovoid jars with swollen rims (type 4) form a substantially homogenous group, distinguished by a sandwich fabric (Plate 11:1), hard and well-fired, with reddish inner and outer surfaces (5YR6/6, reddish yellow) and a buff core (10YR6/4, light yellowish brown). Grooved-rim jars were made in a coarser and porous fabric, apparently featuring a higher degree of variability. At a macroscopic approach it seems to comprise two main groups of fabrics, ranging respectively from red to a pinkish-buff color (from 5YR5/6, yellowish red, to 7.5YR6/4, light brown) and from yellowish-green (5Y6/2, pale olive gray) to a grayish color (2.5Y6/1, gray). Jars with different surface treatments were made in fabrics belonging to both groups.

These observations were tested through characterization analysis of a selected sample of sherds (see Santarelli, in this volume), belonging to both morphological types of vessels and to the different groups of fabrics within each type; further analyses on jars type 5 are in progress.¹³ Microscopic observation in thin and thick sections, X-ray diffraction (XRD), and thermogravimetry combined with differential scanning calorimetry (TGA/DSC) were carried

out to determine the firing temperature, clay composition, and the nature of the aggregates.

Data yielded from the analysis substantially validated the first macroscopic observation, allowing us to identify three different petrographic groups (see Santarelli, in this volume, [Figure 6.1](#)).

1. Petrographic Group A (e.g., TM.82.G.515/4) is characterized by a red streaked color of clay, a fine quartzitic carbonatic aggregate containing quartz, gehlenite, and calcite; analysis in the thin section has also revealed for this petrographic group diffused micropores that were not visible in the macroscopic observation. The firing temperature ranges between 700 and 750°C (Plate 11:1).
2. Petrographic Group B (e.g., TM.82.G.530/20) is distinguished by a pink-reddish clay color, a medium-fine siliceous matrix with calcitic/quartzitic aggregate containing quartz, gehlenite, and calcite, and a high porosity (closed pores and micropores). Firing temperature does not exceed 750°C (Plate 11:2).
3. Petrographic Group C (e.g., TM.83.G.341/92) features a buff-greenish color and a pale micritic matrix with volcanic aggregates containing gehlenite, diopside, calcite, quartz, hematite, and magnetite. Firing temperature does not exceed 850°C (Plate 11:3).

Ovoid jars with swollen rims are made only of clays pertaining to Petrographic Group A ([Figure 6.6](#), Plate 11:1), while the grooved-rim jars are realized in clays belonging to both Petrographic Groups B and C, and never to Group A. Concerning the grooved-rim jars, which feature a slight variability in both morphological and petrographic terms, these different orders of data can be compared. In fact, jars of types 1 and 2 ([Figures 6.1–3](#)) can be produced equally in Group B and C fabrics (Plate 11:2–3), while type 3 ([Figures 6.4–5](#)) seems to be produced mainly in Group C fabrics (Plate 11:3).

4. TECHNOLOGICAL ASPECTS AND MANUFACTURE PROCESSES

From a technological point of view, both ovoid jars with swollen rims and grooved-rim jars are made with a coiling technique partly carried out on a slow wheel, but possibly with some differences within the manufacturing process of each type.¹⁴ In fact, ovoid jars seem to be more carefully fashioned (Plate 10:3–4), and surface features and macrofabrics suggest that a higher number of stages is accomplished on the slow wheel, from forming and joining the coils to thinning and shaping the body.¹⁵ Such a process seems to be suggested not only by parallel concentric striations on both inner and outer surfaces of the sherds, which may simply imply a finishing process on a rotational device, but also and above all by the strong modification of the inner and outer walls of the vessels, where joins of coils are still visible but tend to be erased (Figure 6.8:1), due to the fact that high pressure has been applied while rotating the vessels within all stages of the manufacturing process. On the other hand, grooved-rim jars are more coarsely made and less refined (Plate 10:1–2). From the analysis of surface features,¹⁶ it seems that the bodies were hand-coiled (Figure 6.9) and the rims were applied to the body and wheel-finished (Figures 6.8:2, 6.10:1–2) or simply wheel-finished (Figure 6.10:3). The outer surface of the vessels was either simply smoothed and bore traces of self-slip (Figure 6.10:2) or was covered by a yellowish slip (Figures 6.9:1, 6.10:1). Though surface finishing is thus evident, it is difficult to assume wheel-coiling as a manufacturing process for those jars, even in a final stage, as it seems to be suggested by some whole specimens in which the joins of coils are still much visible also on the exterior of the vessels (Plate 10:1–2), as if a very weak pressure had been applied to modify the outer surface.

Rims can be made according to different techniques. On type 1 and type 2 jars, rims are folded outward and/or realized through the addition of a coil and then modeled (Figure 6.10:1), while the rims on type 3 jars are fashioned in a triangular shape and finished (Figure 6.10:2).

Rim finishing, too, can be accomplished through different methods. Jars belonging to type 1 (Figures 6.1–2) feature the highest variability of techniques, all accomplished on the slow wheel: irregular and wide grooves probably obtained through finger impression (Plate 12:1), narrow and regular grooves modeled with a potter's stick (Plate 12:2), and, finally, thin incisions, allegedly aimed at reproducing the aesthetic result of grooves made with a stick (Plate 12:3). In this respect different techniques are employed to rims finishing in order to achieve the same visual result, thus reflecting the existence of a common model. On the other hand, the rims of type 3 jars are made exclusively with the latter technique.

Recent contributions to pottery analysis (Roux and Courty 2005) have put forward an approach that combines morphostylistic aspects, petrographic description of fabrics, technological features, and geographical distribution of vessels in order to isolate well-defined “techno-petrographic groups” within a given ceramic assemblage, which are deemed representative of groups in terms of socioeconomic or productive units. The assumption that deliberated choices within each of those fields can be interpreted as markers of “identity,” in broad terms, lies at the basis of such an approach. Thus, in our analysis, data on manufacturing processes, matched to and crossed with typological and petrographic aspects, would allow us to isolate techno-petrographic units, each defined by the systematic association of morphology, selection of fabrics, and other technological features (such as surface treatments, for instance) and technological choices within the manufacturing processes. These ones may bear significance on the organization of ceramic production within the assemblage that we are analyzing hereby. Thus, combining different kinds of data from jars types 1–4, two broad groups could be isolated, one comprising only type 4 jars (Plate 10:3–4), and one including types 1–3 jars, apparently less homogeneous (Plate 10:1–2).

Such distinction could be meaningful in terms of production (see also Mazzoni, in this volume). In fact, summing up the data collected above,

type 4 jars are distinguished from types 1–3 jars not only morphologically, but also in terms of the petrographic and chemical composition of clay (Petrographic Group A; see Santarelli, in this volume), manufacturing process (wheel-coiling), and geographic distribution. Thus, type 4 jars make up a group *per se*. Type 1–3 jars, though all belonging to a single class, feature some degree of variability in the selection of clays and manufacturing techniques of the rim. Thus, all types can be made in clays belonging to Petrographic Group C, but types 1 and 2 can be made also with clays of Petrographic Group B, while type 3 jars do not. Furthermore, type 1 jars feature all the range of finishing techniques for the rims, while types 2–3 present only rims finished through a potter's stick. Finally, within surface treatments, the same aim is achieved through smoothing or coating with an outer slip, a technique that cuts across the different groups of fabrics and morphological types of jars.

Despite these differences, all the grooved-rim jars share the very same manufacturing technique: and this, in terms of the organization of ceramic production within this class, seems to be the most meaningful information. Thus, the slight variability observed within the grooved-rim jars does not seem to suggest, in the end, the existence of different groups within those types, but only a probably more “dispersed” organization of the production between centers having all access to a same source of clay (Petrographic Group C), with some of them employing a second one also (Petrographic Group B), and sharing the very same technology, although adopting minor variations to obtain similar aesthetic results.

5. FORM AND CONTENT: A PRELIMINARY APPROACH

The definition of specific functions for the storage vessels from Royal Palace G assemblage is quite problematic. A definitive identification of contents could be possible only through specific analyses of possible organic residues, such as gas chromatography. At the present state of research (given the impossibility to perform such types of analysis), some functional considerations for

the storage vessels of Palace G can be outlined with the aid of archaeobotanical analyses and textual sources from Royal Archives in order to reconstruct the socioeconomic organization of the Palace of Ebla and to identify specific kinds and amounts of centralized goods. Textual sources give account of incoming and outgoing agricultural products (such as cereals, wine, and oil), land management (in relation to different crops), and the system of redistribution of food rations to the Palace's workers (Milano 1987a; 1990a).

Moreover, the texts mention both the presence of granaries administrated by supervisors (*ugula engar*) in the countryside and the availability to the palatial administration of a very large amount of barley, in a quantity sufficient to supply food rations for one year to an estimate of twenty thousand people (Milano 1996, 144). Cereals were kept in silos or jars in different rooms of the Palace, often in working or food processing quarters (see Wachter-Sarkady, in this volume). Concerning oil production, a number of olive groves located in villages in the Ebla surroundings is attested; furthermore, the presence of four thousand jars of oil in the palace and of seven thousand jars in the suburbs is reported (Archi 1988b, 164). An unpublished tablet (TM.03.G.1000) records the dispatch of a total of 1081 *la-ḥa* of oil to Mari.¹⁷ Vineyards are also mentioned in the texts, although far less numerous than olive groves (Archi 1991, 213; Fronzaroli 1994, 122; Milano 1994, 436n79; 1996, 138 with nn24–25). Wine was both produced locally and imported. In fact, part of the incoming amount of wine (*geštin*) came from the “royal fields” (*gána-kú*) as a tribute in return for the land grant, while the most of wine products seem to be received from different centers located to the north, northeast, east, and south of Ebla (Archi 1993b, 28–31).¹⁸ Two texts, TM.82.G./265 and TM.84.G./201 (see Milano 1994, 436n81), found in L.3143 and L.3474 of the Southern Quarter of Royal Palace G, record outgoing deliveries of 100 and eighty-five jars (*dug*) of wine respectively (Archi 1993b, 18–26); the presence of the texts in those rooms could be

related to the temporary registration of the goods stored in the nearby South Unit.

According to the volumetric estimate of storage jars capacity (distribution analysis) two concentrations emerge, corresponding to values comprised between ca. 31–50 and 108–126 liters (see § 2, and [Figure 6.12](#)).¹⁹ However an univocal correlation between actual measured capacity and textual evidences is still far to be established. In fact, quantitative data on water and beer, which can be inferred from the texts, are scanty, while amounts of oil and wine are generally expressed either in capacity units (e.g., *an-zam_x* and *sila*) or according to the number of jars (*dug* or *la-ḥa*), which appear to have capacities of 20 (the *dug* jar) or 30 (the *la-ḥa* jar) *sila* (Milano 1990b, 247–49; Archi 1990c, 152n16–17; 1991, 217–19). Even if there is no general consensus on the measure of the *sila*,²⁰ and the above-mentioned data do not allow a definitive estimation of capacity for those jars mentioned in the texts, the *la-ḥa* jars were possibly also referred to as a standard measure of capacity. On the other hand the term *dug* could be employed with the general meaning of “vessel.”²¹ The *la-ḥa* jar seems, based on textual evidence, to have been a multifunctional container, both for solid and liquid products. It is noteworthy that in the Ebla texts two types of *la-ḥa* jars are mentioned beside the standard one: the *la-ḥa maḥ* and the *la-ḥa tur*, referring respectively to “bigger” and “smaller” *la-ḥa* jars (Archi 1991, 218; see also Marchesi, in this volume; on the *la-ḥa* jars see Pasquali 2005, 39–40,).

Turning to form and content, grooved-rim jars, ubiquitous in the Palace, might have been employed both for cereals and water (see also Mazzoni, in this volume).²² On the other hand, ovoid jars with swollen rims (which seem to have been not locally produced) have been identified as possible oil containers due to their similarity with the Pattern Combed jars and the presence of cylinder seal impressions (Mazzoni 1994a, 252), but a function as containers for wine could be also suggested. In fact wine, according to textual evidences mentioned above, could be partly locally produced, partly imported. The prevailing

distribution of ovoid jars with swollen rims in the eastern and northern sides of the region, from Tell Mardikh to the Euphrates including the river Quweiq, could correspond to the mention in the cuneiform tablets of the Archives of some sites located to the north and east of Ebla (for example Gudanum, Kakmum, Dub, and Emar). In this area, wine production during the third millennium B.C. is suggested by archaeological evidences, while for the second millennium B.C. the Mari texts recorded shipments of wine from the cities of Karkemish and Aleppo.²³

Finally, medium size jars with elongated body and restricted necks and with a 20–30 liters average capacity, are likely to be liquid containers (*ibidem*, 274, fig. 9, 275, fig. 10). In particular, among those ones, the jars with channeled rims made of a hard metallic-fired fabric could be oil containers, according to typological and technological characters ([Figure 6.11:1](#)).²⁴ The peculiar shape of the rim, which is turned upright forming a kind of inner step, could have been functional to hold a stopper or a lid. On the other hand, those jars are made of hard, metallic-fired, fabrics, with a gray core and reddish polished surfaces, that recall those ones of other classes of vessels, whose destination as oil containers has been demonstrated so far, such as the Pattern Combed jars.²⁵ Those ones, though in smaller amounts, are also attested at Ebla (Mazzoni 1985a, 2, fig. 3:18–19; 1985b, 565, fig. 6:4, 8; see also Mazzoni, in this volume; here [Figure 6.11:2–4](#)), where they are likely to be imported from the coastal area (see Mazzoni 1982, 188–189; 1988, 87).

In conclusion, finding correspondences between form and content remains a difficult task and further analyses are necessary to combine archaeological and textual data in a coherent and systematic definition of specific vessels functions. That notwithstanding, a supra-regional approach, taking into account different classes of data (petrographic, volumetric, organic residues) from other neighboring areas (e.g., the Euphrates Valley, Syrian and Lebanese coasts) could provide a documentary base for integration and comparison.

NOTES

- 1 This contribution has been conceived together by the Authors; A. Vacca wrote § 2, M. D'Andrea wrote § 4, while §§ 1, 3, and 5 have been written together. We would like to thank Paolo Matthiae for charging us with this study. Maria Giovanna Biga and Gianni Marchesi have discussed with us textual data and interpretation, and provided helpful suggestions; we are grateful to both of them. All remaining mistakes remain our own responsibility.
- 2 A volume of about 10 liters is calculated for the Metallic Ware jar TM.G.83.441/1 (11,83 l) (Mazzoni, in this volume, Figure 5) and for the Reserved Slip jar TM.75.G.240/C (12,33 l) (Mazzoni 1994a, fig. 8.2); a volume of about 20 liters is calculated for cylindrical jars with restricted necks: TM.74/75.G (25,8 l) and TM.75.G.240/D (22 l) (*ibidem*, figs. 9.1, 10.2); finally capacity of 30 liters is calculated for jars TM.75.G.510/4 (32,5 l) and TM.75.G.264/5A (32 l) (*ibidem*, figs. 9.2, 10.1).
- 3 Type 5 jars are also quite common in Royal Palace G pottery equipment. Analyses of this type of storage vessels, including chemical and petrographic characterization, are still in progress, and will be presented in a next study.
- 4 The volume of complete jars was calculated by uniforming the shape of each jar to an ideal cylinder. The ideal radius is equal to the average of the base radius and the maximum expansion radius.
- 5 TM.88.G.285/1: 81 l (Figure 6.1:2); TM.75.G.246/5a: 93 l (Figure 6.1:4); TM.83.G.101/1: 109 l (Figure 6.1:3); TM.88.G. 823/1: 113 l (Figure 6.1:1). For jar TM.83.G.101/1 Dolce (1994, 300–1, figs. 22, 27) estimated a volume of 92 liters.
- 6 This type has been described by Mazzoni (1988, 89) as scabbled grooved-rim jars.
- 7 The decorative technique is observable on some sherds, as in sample TM.83.G.72/9 (Figure 6.5:6–7). Here it is evident that the potter firstly incised the horizontal lines and then the wavy ones that cover and intersect them.
- 8 This estimate was made comparing published data from previous excavations (Mazzoni 1994a, 258, 262, tables 3, 5) with the original documentation of Royal Palace G stored in the archives of the MAIS, integrated also with data from the latest excavations (2003–2007).
- 9 P. Matthiae (2010b, 80) has proposed for this jar the function of container for liquid, which were prepared in the adjacent kitchen L.2890, and offered to guests received in the Court of Audience (see also Wachter-Sarkady, in this volume, for archaeobotanical analyses).
- 10 The Hama specimens never have incised decorations on the outer surfaces.
- 11 See Castel et al. (2008, 46, fig. 18, RW1.2363.1 and RW1.4224.2). The last jar is complete and bears an incised decoration with two superimposed rows of wavy lines and a potter's mark on the shoulder.
- 12 Tell es-Sweyhat (Holland 2006, plate 266:1, 2, 5); Tell Munbatah (de Maigret 1974, 282, fig. 9:76); Tell Rifaat (Matthers et al. 1978, fig. 10:49); Tell Hadidi (Dornemann 1979, fig. 16:31); Tell Ahmar (Thureau-Dangin and Dunand 1936, fig. 31); Tell Selenkahiye (Schwartz 2001, plate 5.A.21.c); Gaziantep (Kulakoğlu et al. 2008, 252, fig. 18).
- 13 Analyses have been carried out by M.L. Santarelli, Dipartimento Ingegneria Chimica Materiali Ambiente, Sapienza University of Rome.
- 14 For ovoid jars with swollen rims, see Mazzoni (1992, 25); for grooved-rim jars, see Mazzoni (2002a, 77; 2003, 185; see also Mazzoni, this volume). The use of mixed techniques in the production of Palace G's grooved-rim jars has been investigated also by N. Laneri with the aid of X-ray analyses (2009, 95, fig. 28).
- 15 Analyses of surface traces of manufacturing techniques on both archaeological and experimental material offer a wide corpus of images for comparison (Rye 1981, 74–80; Roux 1994, figs. 4–6; Courty and Roux 1995, 26–30, figs. 3–6, 15–16; Roux and Courty 1998, 750–55). Furthermore, studies by Roux and Courty on ancient pottery technology, particularly focused on the wheel-coiling technique, have distinguished four different techniques according to which of the successive stages within the manufacturing process of a vessel—building coils, joining coils, thinning coils, finishing the vessel—are accomplished on the slow wheel (Courty and Roux 1995; Roux and Courty 1998, 748–55; Roux 2009, 199–202). Within the simplest system, the rough-outs are hand-coiled and the vessels are only finished on the tournette; within the more complex one, all the stages are executed while rotating the vessels on the slow wheel. Generally speaking, within the manufacturing methods in which three or four stages are executed on the slow wheel, the greater the pressure applied to the vessels conveying rotatory kinetic energy, the

greater the modification of surfaces and the lesser the visibility of joins (though they remain identifiable). On the contrary, within the simplest manufacturing processes only a slight modification of the surfaces of the vessels intervenes, resulting in highly visible joins of coils. Thus, this analyses have provided a detailed set of data on the different traces left on inner and outer surfaces of vessels and sherds by each system of wheel-fashioning, which can be applied for comparison to archaeological materials from different periods and contexts, as we have tried to propose for some classes of storage jars from Ebla's Royal Palace G.

- 16 For a description of different wheel-fashioning techniques and related surface features see Roux 1994; 2009; Courty and Roux 1995; Roux and Courty 1998.
- 17 According to an unpublished translation by Biga, the total amount of oil jars was sent to Mari in the second year or in two years (1 *li-im* 81 la-ḥa ṯ-giṣ ṯ-giṣ è *Ma-rī*^{ki} 2 mu). Eight hundred of these la-ḥa were sent to the king of Mari. We would like to thank warmly Maria Giovanna Biga for providing us with these data and allowing us to cite them hereby.
- 18 Burman, Dub, Emar, Garmeum, Gudanium, Ibub, Ib'al, Kakmium, Manuwad, Ursaum (Milano 1994, 435; Fronzaroli 1994, 122–23).
- 19 A calculation of the capacity of jars from Early Bronze Age levels of the Tell Arqa has been carried out by Thalmann (2006, 125–28, fig. 53). Jars have been classified in three ranges of capacity, respectively around 20–30 liters, 50–80 liters and 100–140 liters.
- 20 On the measure of the sīla a general consensus has not been achieved yet. According to Archi (1991) one sīla corresponds to one liter; on the other hand according to Milano (1996, 146), such an equivalence should not be taken for granted. Recently Chambon (2011b, 25–28, 133–36) has put forward the hypothesis that one sīla is 3 liters worth.
- 21 The term dug could be employed also as a determinative, such as in the cases of ^{dug}an-zam_x and ^{dug}an-zam_x kaš, indicating respectively a small capacity vessel and a beaker (Chambon 2011b, 57n186); on the other hand, a teapot from Mari bears on the shoulder the inscription “dug ½ sagšu” (Parrot 1959, 135, plate XXXII; Chambon 2011a, 57).
- 22 A function as water containers was suggested by Matthiae (1995, 119). A large use of storage jars also as cereals containers in the Palace G is suggested by the archaeobotanical analysis (see Wachter-Sarkady, in this volume).
- 23 Botanical analysis at Tilbeşar, located in the region of Gaziantep, confirms that grape seeds were abundant from Phase III C (2500–2300 B.C.), suggesting the production of wine (Kepinski 2007, 155–56); similarly, plastered basins with a high concentration of tartaric acid, related to wine production, were documented in dwellings at Titrish Höyük (Algaze 1999, 549). According to the Mari texts of the Zimri-Lim reign, a high percentage of wine was imported from the cities of Karkemish and Aleppo. These texts are also noteworthy since they provide data on wine processing with the addition of sweet substances such as honey (Chambon 2011a, 497).
- 24 At Tell Arqa Pattern Combed jars with vertical loop handles, apt for transportation, are generally medium-size jars of 20 or 30 liters capacity (Thalmann 2006, 125–28, fig. 53).
- 25 Pattern Combed jars have been found in contextual association with olive oil factories at Khirbet Kerak (Esse 1991, 123–25), Lower Galilee, and at Ugarit-Ras Shamra (Courtois 1962, 418–25, figs. 3 and 12), coastal Syria. Their use as oil containers has been suggested also by Flender (2000) and Genz (2003), due to the retrieval of such vessels, often seal-impressed, together with combed spouted-vats at Khirbet ez-Zeraqon, northern Transjordan.

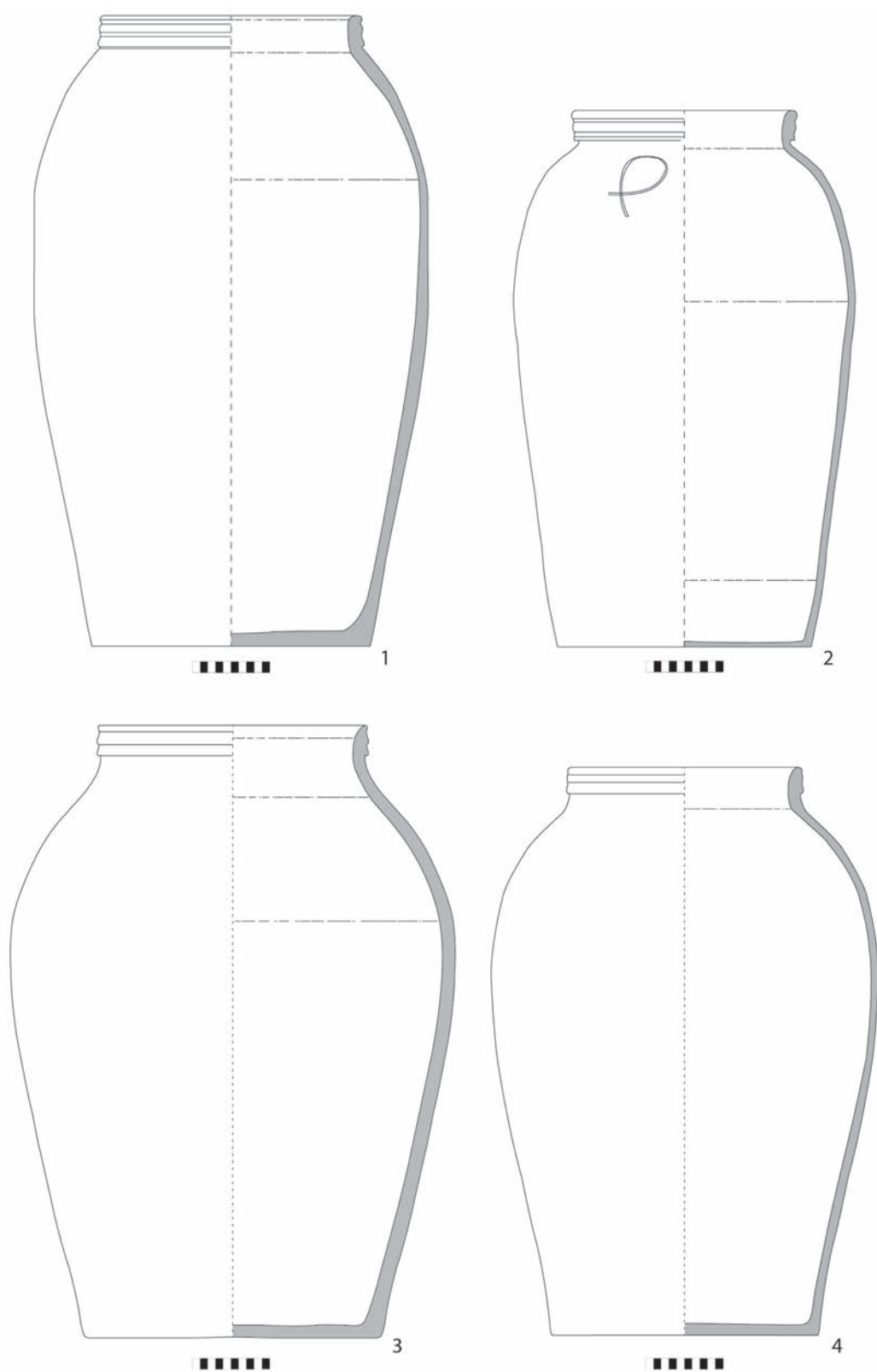
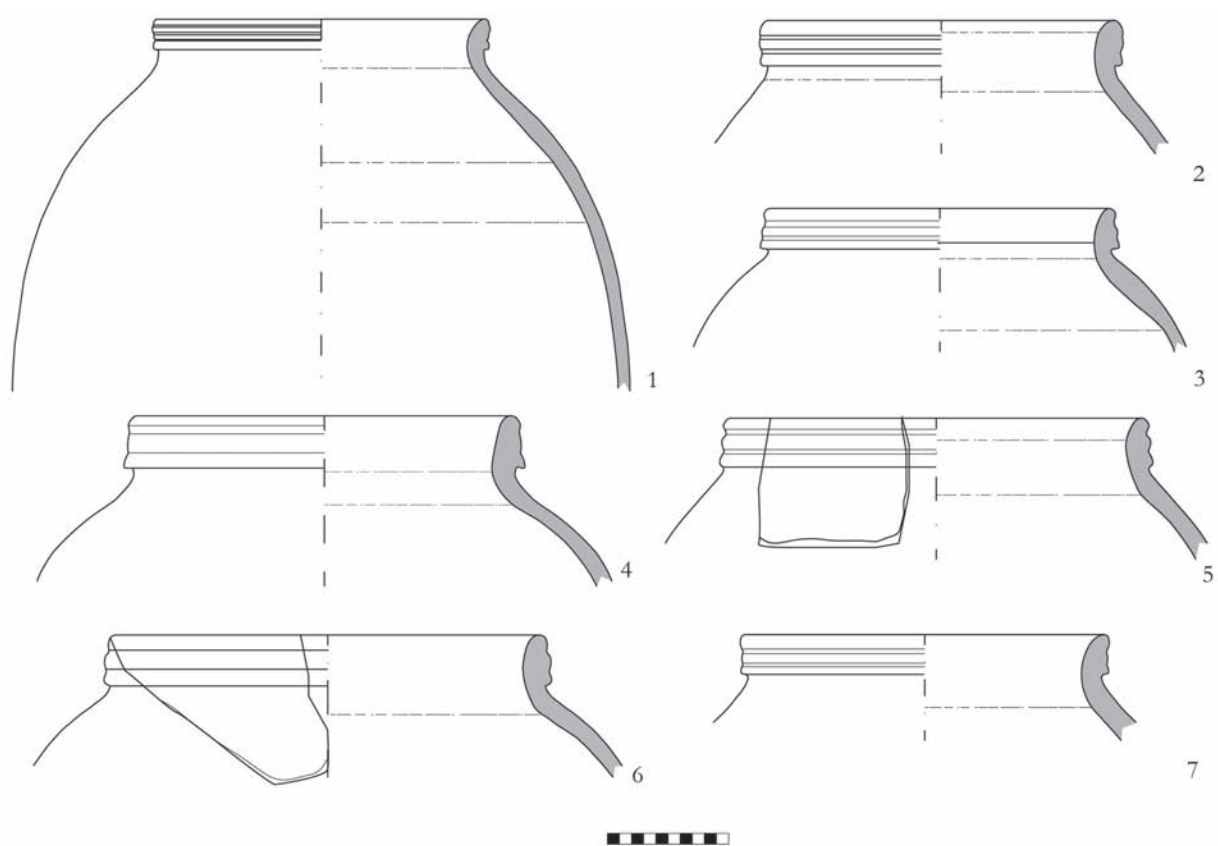


Figure 6.1. 1. TM.82.G.823/1 (L.2834): 113 liters; 2. TM.88.G.285/1 (L.4422): 81 liters; 3. TM.83.G.101/1 (L.3512): 120 liters (Mazzoni 1988, fig. 3:3); 4. TM.75.G.246/5A (L.2617): 93 liters (Mazzoni 2002a, pl. XLI, 113).



8



9

Figure 6.2. 1. TM.82.G.550/1 (L.3464); 2. TM.82.G.515/3 (L.3464); 3. TM.75.G.925/5 (L.2769); 4. TM.88.G.295/1 (L.4420); 5. TM.83.G.124/21; 6. TM.83.G.462/9 (L.3464); 7. TM.75.G.562/2 (L.2822); 8. Grooved-rim jars inserted inside benches in room L.2834; 9. Jar TM.88.G.285/1 in situ in room L.4422.

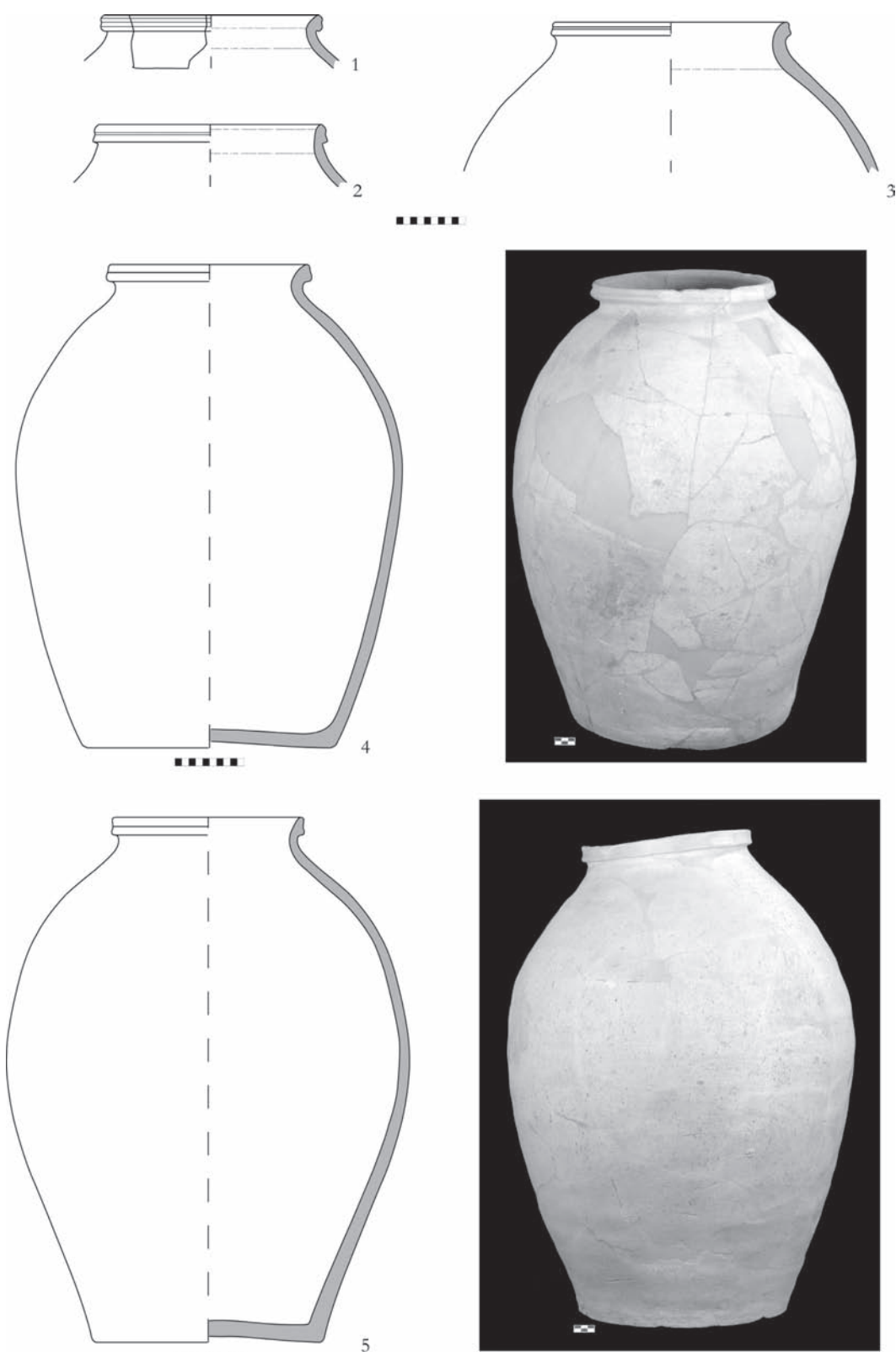


Figure 6.3. 1. TM.88.G.337/4 (L.4452); 2. TM.84.G.333/7 (L.3474); 3. TM.83.G.445/3 (L.3464); 4. TM.85.G.388/1 (L.3914): 106 liters; 5. TM.85.G.367/1 (L.3914): 108 liters.

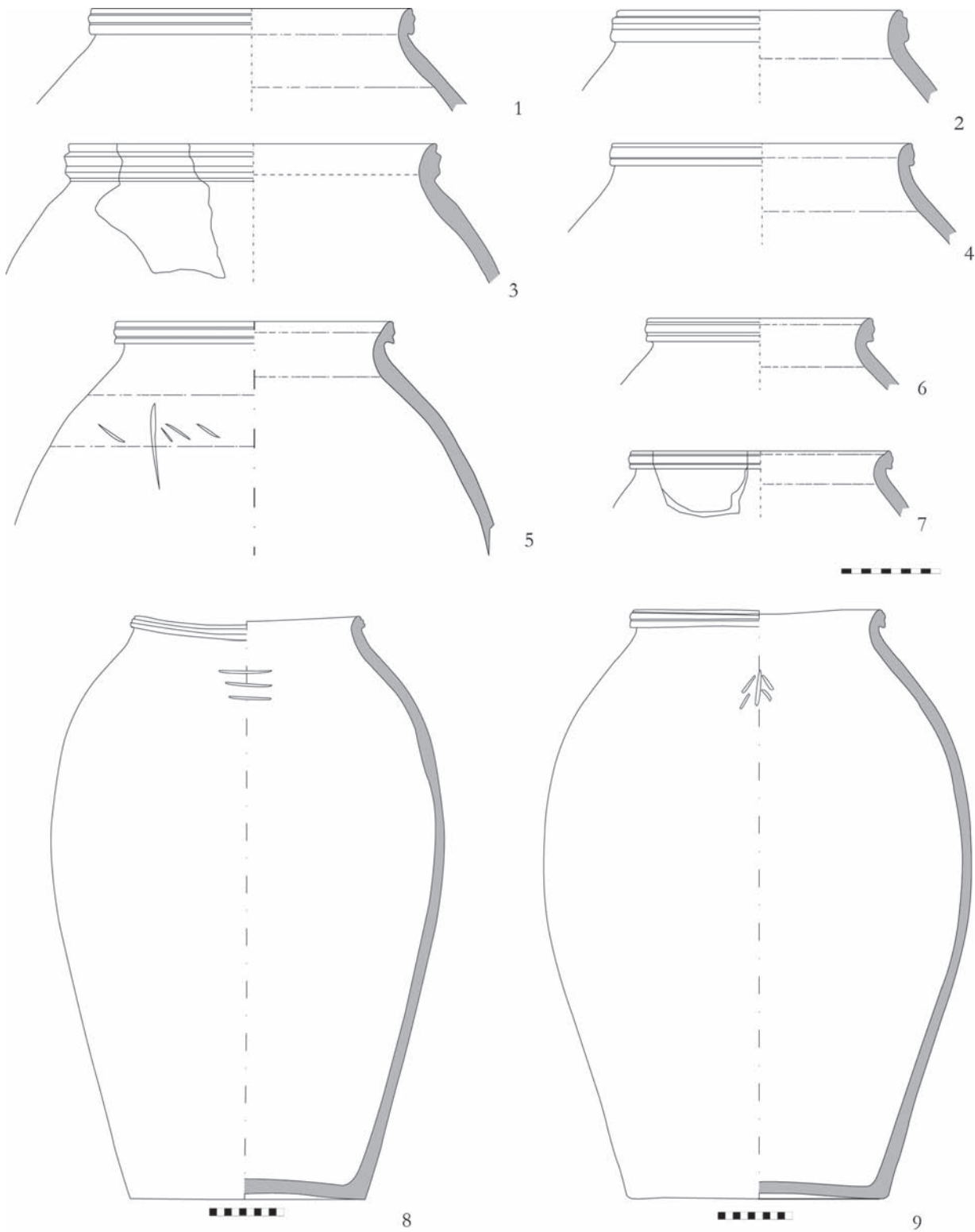


Figure 6.4. 1. TM.83.G.453/1; 2. TM.82.G.491/1 (L.3466); 3. TM.89.G.309/11; 4. TM.77.G.208/23; 5. TM.83.440/1 (L.2834) (Mazzoni 1982, fig. 30:19); 6. TM.82.G.530/10; 7. TM.83.G.325/49 (L.3471); 8. TM.83.G.28/1 (L.3500): 104.1 liters (Mazzoni 1988, fig. 8:5); 9. TM.83.G.40/1 (L.3500): 123.03 liters (Mazzoni 2003, figs. 2–3, 8).

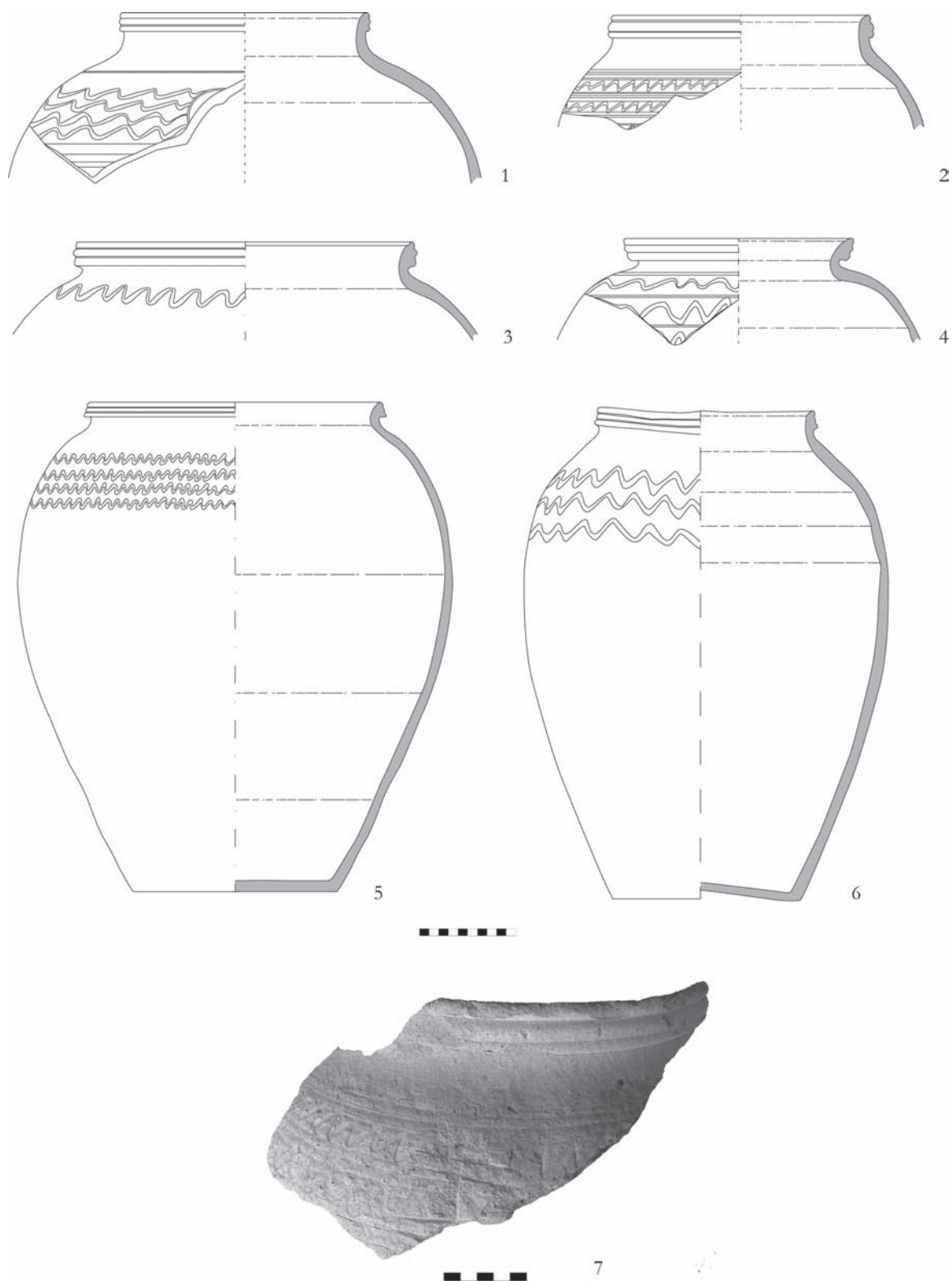


Figure 6.5. 1. TM.83.G.535/1 (L.3464a); 2. TM.83.G.72/9 (L.3512); 3. TM.88.G.397/1 (L.4436); 4. TM.88.G.290/1 (L.4436); 5. TM.82.G.600/1: 43.05 liters; 6. TM.75.G.189/14 (L.2712): 31 liters (Mazzoni 1994a, fig. 8:3); 7. TM.83.G.72/9 (L.3512).

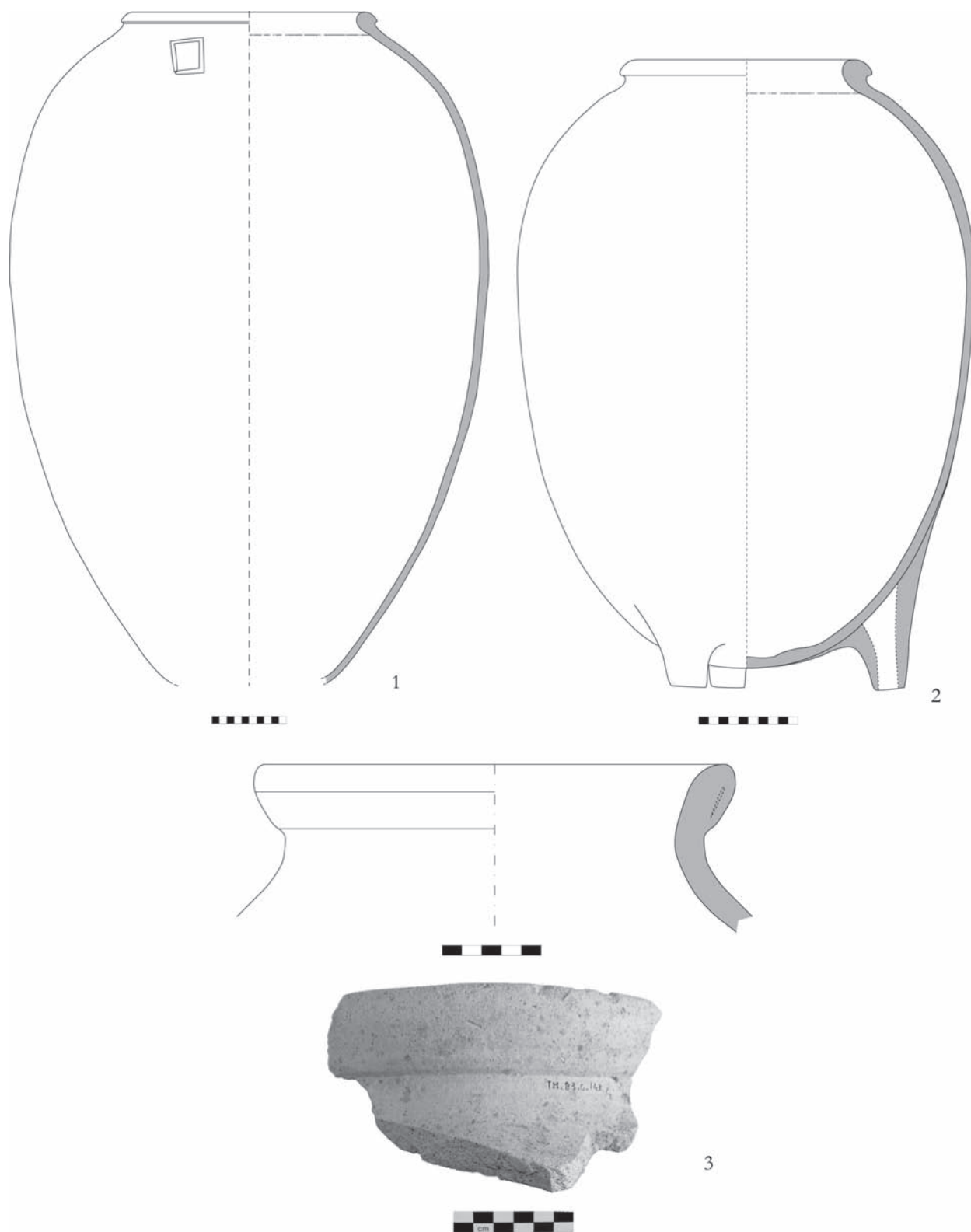


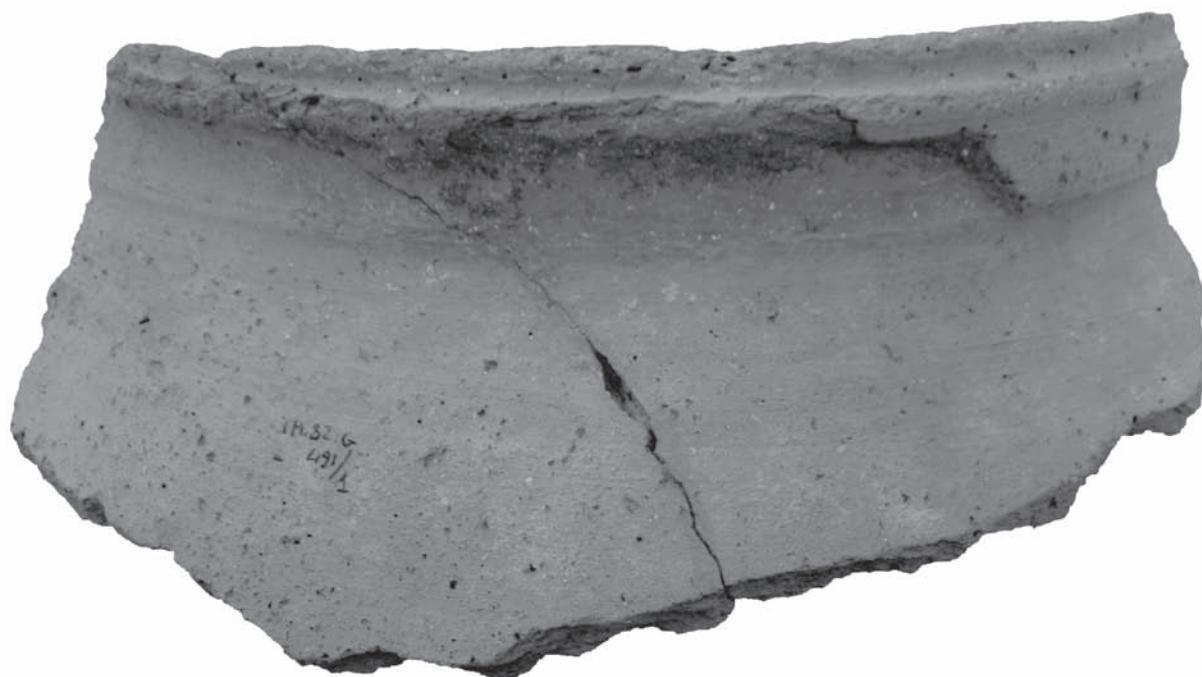
Figure 6.6. 1. TM.83.G.367/20 (L.3471): 126.34 liters ; 2. TM.75.G.280/12 (L.2617): 43.25 liters ca.; 3. TM.83.G.143/7 (L.3518).



Figure 6.7. Distribution map of grooved-rim jars (types 1–3) and ovoid jars with swollen rim (type 4) within Royal Palace G (EB IVA).



1



2

Figure 6.8. 1. TM.82.G.515/4 (L.3464), fragment of jar with swollen rim made with the wheel-coiling technique, the black arrows mark visible joins of coils; 2. TM.82.G.491/1 (L.3466), fragment of grooved-rim jar with rim applied on the outer surface and wheel-finished.



1



2

Figure 6.9. 1. TM.75.G.822/5; 2. TM.82.G.473/1b (L.3463). Fragments of grooved-rim jars showing traces of manufacturing techniques, the black arrows show visible joins of coils.



1



2



3

Figure 6.10. 1. TM.82.G.530/28, grooved-rim jar with rim applied to the outer surface and modeled on the slow wheel trough a potter's stick; 2. TM.82.G.530/20, grooved-rim jar with rim applied to the outer surface and modeled on the slow wheel trough a potter's stick; 3. TM.82.G.541/31, grooved-rim jar with rim wheel-finished on the slow wheel with a potter's stick.

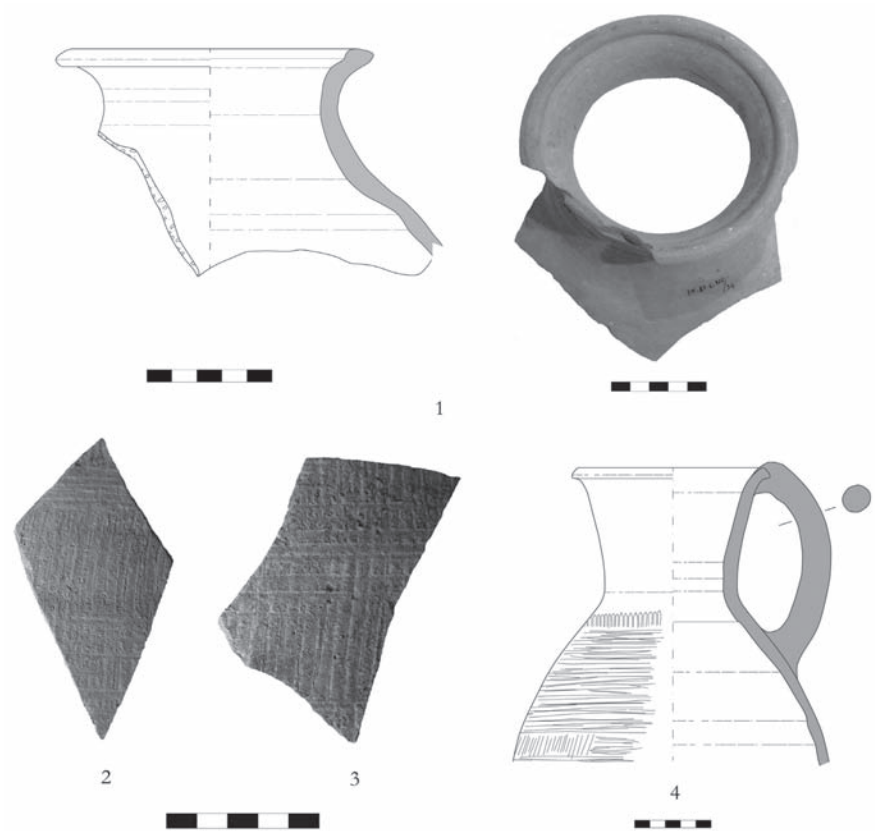


Figure 6.11. 1. TM.82.G.325/34, jar with channeled rim from the Royal Palace G; 2. TM.83.G.362/14 (L.3471), fragment of Pattern Combed jar from Royal Palace G; 3. TM.83.G.362/13 (L.3471), fragment of Pattern Combed jar from Royal Palace G; 4. TM.88.G.315/11 (L.4446), Pattern Combed jar.

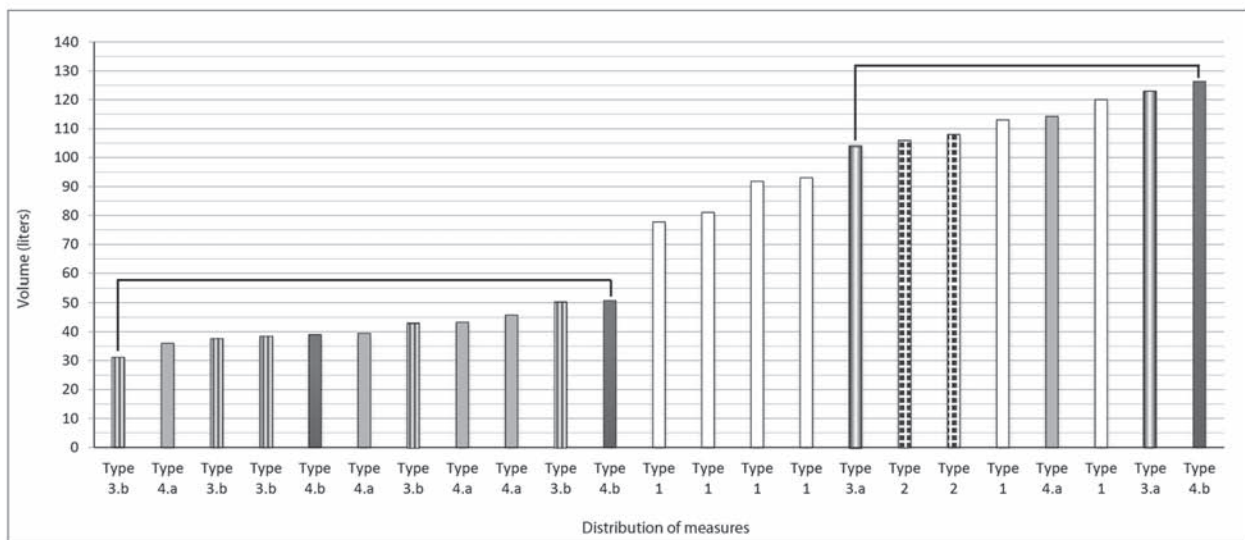


Figure 6.12. Graph showing the distribution of the jars volumes.

CHAPTER 7

WORKING FOR THE ELITES

The Pottery Assemblage of Building P4

N. Marchetti

During the last twenty years, our knowledge of the urban shape of Ebla in the classic Early Syrian period (i.e., Early Bronze IVA according to an archaeological terminology, hereafter EB IVA) has changed significantly. The articulated and massive structures of Royal Palace G were preserved along the western and southern slopes of the Acropolis of Ebla (see the two articles by Matthiae in this volume), whereas at the top of the mound the evidence from that period had been removed in most cases by later superimpositions. In the Lower Town, EB IVA remains survived only when protected by Middle Bronze Age ramparts (as in Area AA) or when they were ritually filled up and overbuilt for ritual reasons (as it was the case with Temple HH). In the southern part of Area P (i.e., in Area P South), in the Lower Town northwest, a building (now called Building P4) was preserved through the later leveling made during MB I to create a large open area.¹ The extensive excavations with resulting materials² and the studies that have been carried out in Building P4³ provide us with the best picture, besides Royal Palace G, for understanding aspects of the economic organization during the classic Early Syrian period.

1. NARROW PASSAGES AND ABRUPT TURNS: THE LAYOUT OF BUILDING P4

Likely all outer limits of the building have been exposed, although pits, the cut for the MB IIB Terrace P3 to the west, and the collapse of some underground cisterns or cavities to the north⁴ have caused wide gaps in the outer perimeter. If

this assumption is correct (see [Figure 7.1](#)), the total area of Building P4 was probably around 700 m², measuring ca. 25 x 30 m.⁵ The central core of the building lies at a lower elevation than the outer surface, probably because it supported an upper story, as shown among other hints by the stairway in L.6164 (in which the lower, complete doorway and the upper doorsill were preserved) and a collapsed floor (L.5236) in L.5214, still with many materials over it.⁶

We did not find evidence of the main entrance, but its original location can be reconstructed with some accuracy on the basis of the floor plan, which suggests it was almost certainly along the northern side. This can be inferred from the peculiar circulation system, based on a passage that ran inside a double wall giving access both to an inner ring of rooms and to a double row of rooms surrounding the inner sector and located along the outer perimeter (along the western side there seems to have been only one row of rooms). The double wall was found filled up with pebbles and sherds, but the steps leading into it from rooms L.5220 and L.6278 (outer sector), L.5021 and L.6156 (middle sector), and L.6162 (core of the building) clearly show that it was once used as a narrow passageway. To the southwest, this double wall ran obliquely, giving an oblique shape also to the rooms along it. The largest group of connected quarters counts five rooms (L.5035, L.5032, L.5033, L.5005, L.5009), followed by a suite of four rooms (L.6156, L.6276, L.6270, L.6838), and then by two or single rooms.⁷ A wide array of installations may be found

throughout the building, hinting at the different activities carried out within the rooms: benches could be lower or higher, rounded with central hollows, or rectangular and much elongated when inset with grinding tables; on the floors there might be shallow pits, plastered ridges, flat stones, or plastered bricks used as working surfaces; and in L.5021 there was a cistern excavated into the limestone bedrock, with a drainage coming from the roof and emptying into it. The plan of the building, unusual as it may seem, was carefully designed: its outer limits are regular and the central core has an (irregular) radial scheme to make communications between different sectors more direct. Lighting must have been a problem in rooms not along the outer limits, but a light well may have been present in the middle (moreover, lamps are attested in the rooms: see below).

As far as the chronology of the building is concerned, we could observe in many spots that at least one earlier floor was present below the one sealed by the EB IVA destruction layer and that several walls were reinforced by adding another mudbrick curtain against them (as in L.5005, L.5214, and L.6270). We can confidently correlate the destruction of Building P4 with that of Royal Palace G, while its construction is obviously more difficult to establish. To the east, the building cuts across an EB III floor (L.5246) and also two fills (L.7220 and L.7221) containing several EB IVA1 shapes, a phase defined by Mazzoni (1991b) as immediately preceding the construction of Royal Palace G.

2. POTS AND CRAFTSMEN

In order to perform a functional analysis of the building as a whole and of the single rooms or blocks of rooms within it, a contextual perspective is necessary, since objects gain significance mainly from their artifactual and architectural associations, and function is a given attribute and not necessarily an inherent one (Appadurai 1986). This article bears on the distribution of pottery shapes within selected rooms of the western sector of Building P4 and as such represents only a preliminary statement on the subject⁸ (a complete analysis may be found in the final

report, in preparation). Pottery studies on the field were carried out by analyzing pottery from each room of Building P4 only after having completely excavated it, and of course by considering together only sherds from single stratigraphic units (i.e., the destruction debris within the room). In many cases, complete shapes were already identified and removed as such during the excavations; in other instances, when the presence of a room could only be surmised—because of the significant lacks in the evidence caused by pitting and leveling—pottery was identified by means of the number of body sherds that could be attributed, when not actually joined, to it on the basis of a careful classification of pastes and thicknesses.⁹ Thus, the pottery drawings at the end of this article represent an illustration, although not yet complete (see [Figure 7.20](#) for L.6158), of the reconstructed assemblage for each room, and as such they do not need to be described overly in detail here, especially after the excellent descriptions of the typological horizon of the period by Mazzoni (1982; 1985a; 1985b; 1988; see also Matthiae 1989a, 113–25).¹⁰

Five rooms that allow to situate the analysis of their pottery assemblages within a contextual discourse are discussed here (L.6162, L.6270–L.6276, L.6298–L.6158). L.6162 is a room with a surface of 10.8 m² and a lozenge shape, due to the orientation to its eastern wall, which is part of the building core. The room was entered, descending three steps, from the main circulation “knot” of the building, an inner passage giving direct access also to L.5021 and L.6156, leading towards the northwest to L.6278 and, perhaps, L.7209/L.7210, and towards the southeast to L.5220 and, perhaps, L.6158 (see note 12 below). Several grinding tables and stones were found on the floor, together with a mortar and a Cananean blade (for the retrieval of a weight, see note 16 below). Within the pottery assemblage, besides the ubiquitous water jars with grooved rim (see [Figures 7.13, 7.23:34, 7.24:35–37, 7.24:39](#), the latter two probably belonging to the same jar), one should note three medium-sized Preservation Ware jars with narrow necks, metallic pastes, and simple potter’s marks ([Figures 7.12, 7.23:31–33](#)). Also interesting is the presence of four Kitchen Ware

cooking pots, two grooved and globular with flaring neck (Figure 7.23:29–30) and two hole-mouthed (Figure 7.22:27–28). That this room was devoted to the transformation of food (and the pierced bottom of a jar, in Figure 7.24:43, must have served as a liquid container since its upper break had been leveled off) seems quite likely; however, a low degree of specialization of sectors within the building is indicated by the fact that L.6162 was connected with another room to the north, L.6272, where craftsmanship activities were carried out (see below).

A row of four connected rooms (L.6156-L.6276-L.6270-L.6838), accessed as said above from L.6156 by means of a stone step,¹¹ showed a significant concentration of materials only in the two middle ones, measuring 6.4 m² (L.6276) and 8.9 m² (L.6270). In L.6270 a limited quantity of pottery was found, which contrasts with the abundant finds from L.6276. In L.6270 there were few Simple Ware vessels (Figures 14 *left*, 25.1–25.4), two medium-sized jars with reserved slip (Figures 25.5, 26.12), two Kitchen Ware pots (Figure 25.8–25.9), plus some other hole-mouthed rims and one andiron fragment, two “incense-burners” (Figure 14 *right*, 25.6–25.7), on the interpretation of which see below, and some Preservation Ware jars, both for storage (Figure 26.10–26.11, plus two other specimens) and for water (Figure 26.13, plus two other specimens). In L.6276, in addition to some usual Simple Ware types, there were two Syrian bottles (Figure 27.10–27.11) and a certain variety of Kitchen Ware knobbed bowls (Figure 27.18–27.19) and pots, both of the globular, grooved type (Figure 28.22–28.23) and of the hole-mouthed one (Figure 27.20–27.21). Among Preservation Ware jars, three medium-sized specimens (Figure 28.24–28.26), two of which with a reserved slip decoration, a large jar (Figure 29.31), and some water jars (Figures 28.27, 29.28–29.29, 32), have also been found. The distribution of objects within the two rooms shows a concentration of nine grinding tables and grindstones in L.6276, where a mortar and a pestle were present too, whereas in L.6270 a pierced stone, a spindle whorl, a flint blade, and nine “polishing” pebbles were retrieved (a grinding table and a grindstone may have

collapsed from an upper floor since they lay upside down). That working activities took place in the latter room is indicated not only by the availability of more free space with respect to L.6276, which is densely packed with jars, but also by the presence of benches along the walls, integrated with an inset and niche (in which two “lamps” were found, see Figures 7 and 8) by the eastern entrance.

From the excavated evidence it is unclear how the two connected rooms L.6158 and L.6298 (measuring 11.6 and 14.6 m² respectively) could be accessed.¹² Quite interestingly, the bulk of Preservation Ware was kept in L.6298: among the larger specimens, there are water jars (Figures 20, 32.31, 33–36, 33.37); ovoid, metallic jars (Figure 33.38–33.41); and one jar with everted flaring and a grooved-rim jar (Figure 32.32; for the latter, see Figure 24.41 and Marchetti and Nigro [1995–1996, fig. 6 from Building P4]; see also Mazzoni, in this volume, fig. 26a–b). Almost only water jars were recorded in neighboring L.6158 (Figure 20),¹³ where on the contrary Kitchen Ware was well attested. In L.6298 almost no objects were retrieved (only a whetstone and a possible balance weight: see note 16 below). In L.6158 some stone tools were present (a large basalt mortar, two pierced stones, four flint blades, and a polishing pebble); some basalt grinding tables with grindstones were collapsed from an upper floor. Simple Ware is attested in both rooms: in L.6298 there were mostly beakers (Figure 30.1–30.12), whereas in L.6158 the typological variety was much greater (Figures 15–17, 34–36, nos. 1–45; the latter is a Syrian bottle). Some installations were built in the rooms: in L.6298 there were a bench to the east, an adjoining sort of shallow basin to the south, in which a Syrian bottle (Figures 11 *right*, 30.22) and a small painted jar (Figure 31.24) were found, and a raised platform with a finely plastered circular hollow against the northern wall. In L.6158 three benches of different height were present against the walls, and in the southeastern corner there was a hollow in the floor. Artifactual distribution points to an integrated use of the two rooms, with L.6298 being the deposit/storeroom and L.6158 the working and cooking (?) area.

3. THROUGH A GLASS, DARKLY

We are not yet in a position to put forward a comprehensive interpretation of Building P4, due to the still incomplete analysis and matching of the collected data on pottery and bioarchaeological samples (Wachter-Sarkady and Minniti, in this volume, discuss only samples from the eastern sector, and the former analyzes only the samples collected during the 1990 season). Only when architectural features, pottery assemblages, small finds, and samples will be presented in full, we will get a reliable basis for attempting a detailed interpretation. However, some preliminary considerations are already possible. The complex represents a single building, and its dimensions and finds point to a connection with the public sphere. It is exactly the quality of this relation that is at stake. We cannot argue much based on the building's topographical position: the proximity with the later Temple P2 suggests nothing, since no remains of an earlier sacred building were detected under the one dating to the MBA (this lack of evidence may be meaningful, since we know from Areas D and HH that the persistence of a sacred place was a noteworthy feature at Ebla: see Matthiae, in this volume [Chapter 1](#)).

The differences in the masonry and the layout of Building P4 with respect to even the peripheral sectors of Royal Palace G exclude a direct architectural relation between the two compounds. Building P4 shows technical solutions unparalleled in the palace, such as the inner distribution passage within double walls, the irregular shape of the rooms, and the “concentric” layout. There are however some important hints that connect directly Building P4 with Royal Palace G. The first one was excavated in room L.5005: here a seal impression on a body sherd of an ovoid jar was found, which is identical to another specimen from courtyard L.2913 in the Administrative Quarter.¹⁴ The other hint is represented by the finds from room L.6272, where tens of figurative inlays in shell, steatite, and limestone were found (see Matthiae, in this volume, [Chapter 1](#), Plate 4:2), which are actually identical to those set into the composite panels of Royal Palace G (Matthiae 2010b, 152–80, plates IX–XIV; Matthiae,

Pinnock, and Scandone Matthiae 1995, 300–29). The fact that also seven ostrich egg fragments, several frit and wooden geometric inlays, a few lapis lazuli elements (actually one lapis curl was found in L.6162), and gold foil scraps indicate that several different elements were assembled in the room, in which many obsidian and flint blades together with two bronze pins were also retrieved (the room does not seem to have been a workshop proper, however, since no unfinished inlay was found).

Precise functional interpretation of pottery shapes is not an easy task, especially in the case of a seemingly not highly specialized assemblage, as is the case with the Ebla EB IVA one, save for a few shapes. Narrow-necked Syrian bottles are generally assumed to have contained anointments (Figures 11, 27.11, 30.18, 30.22, 36.45). Decorations on Simple Ware and medium-sized Preservation Ware jars, not including here rilling and corrugation, are simple. As for the painted ones, trefoil pitchers (see Figure 27.14, probably used for pouring wine) with their more elaborate motives are scarcely attested in the building, and small jars mostly have only some parallel bands. Incised decorations are limited to wavy lines on water jars (Figures 23.34, 24.36, 29.28), whereas (pseudo) reserved slip (in most cases a wash on parallel lines: see Mazzoni 1982, 165, 168) is well attested ([Figures 25.5](#), 26.12, 28.25–28.26, 31.28). Cooking pots are easily identifiable typologically and according to their medium-fired, gritty paste and to their surface burning, the main types being the hole-mouth and the one with everted neck and beaded or thickened rim. The “incense burners,” always burnt inside and present in small numbers in almost every room, were probably used as lamps in their standard typology (flaring bowl over a fenestrated foot: see Figures 14 right, 18, 22.24, 25.6–25.7, 36.46–36.47), while it is uncertain, even unlikely, that this would be the case also for more globular specimens (Figures 31.25, 37.50–37.51, 22.26, and 37.52 are even more doubtful because slightly larger). Water jars as a matter of fact were found covered in their inner lower walls with a white limy film, quite a clear proof that they contained water that was subject to evaporation due to their porous paste (a feature meant to keep

the water cool: see Figure 13). The function of other storage jars may be determined through an analysis of their contents (see Wachter-Sarkady, in this volume, on the samples from the eastern sector of Building P4, yet to be systematically matched to pottery shapes; see also D'Andrea and Vacca, in this volume). Assemblages in neighboring rooms seem complementary, at least partly, and they are instrumental in reaching a functional interpretation of the single rooms first, and then of the entire building. Considering the pottery assemblage from Building P4 as a whole, on the basis of the ca. 1,400 sherds registered thus far (Figure 38), we may in fact note that there seems to be no specialization as far as Kitchen Ware and Preservation Ware are concerned, their percentages ranging between 10 and 20 percent; by contrast Simple Ware accounts for almost 65 percent of the whole (actually 70 percent including Metallic Ware), which would point to the fact that the place did not serve as a central storage unit.

Faunal remains point to a consumption mainly of sheep, followed by cattle and a few wild species, with a relatively high percentage of young individuals (see Minniti, in this volume). Plant remains, all edible (mainly barley, other cereals such as rye, legumes, vine, olives, and nuts), are attested in the building. Cereals were introduced in a clean state and they were mainly processed for consumption, probably together with legumes, and not for storage (no special concentration occurs among analyzed samples: see Wachter-Sarkady, in this volume), even if a limited storage for daily requirement cannot be excluded. The presence of both cultivated and wild fruit is also significant to appreciate the complete and varied diet of the occupants, with olives being the main recorded species. No large fireplace was identified in the excavations, although andiron fragments were retrieved in some rooms: the food was thus cooked elsewhere, and only occasionally in the rooms. Even the pyrotechnological equipment of the workshop in rooms L.5005 and L.5009 (Marchetti and Nigro 1995–1996, 16–17, fig. 15) is mostly suitable for limited, small-scale activities. Water was kept most likely in the “water” jars and could be attained from the cistern in room L.5021.

Potter's marks (also referred to as pottery marks or potmarks in literature) are attested mostly among Preservation Ware jars of various sizes (Figures 23.31, 23.33–23.34, 24.35, 24.38, 26.10–26.13, 28.24–28.26, 29.28–29.29, 31.30, 32.31, 33, 33.37, 40). Having seemingly been incised before firing, they seem to relate to aspects of pottery production, although according to an unsystematic pattern (see Mazzoni 1988, 89–91; in this volume, § 4). The seal impressions on jars—related to an ancient tradition (Mazzoni 1992; Sørenhagen 2011) and linked to medium- and long-distance trade (see also Olijdam 2008)—may instead refer to the contents of the vessel, especially in the case of cooking pots (Graff 2012; see Wachter-Sarkady, in this volume, for some thoughts of the ingredients found within). As a matter of fact, the circulation patterns at the intra-*chora* level or within the surrounding area are clearly indicated by the occurrence of the same seal in impressions on vessels from Hama and Ebla (see Mazzoni 1992, 405, cat. nos. A6, A36, A40 from Ebla and cat. no. B101 from Hama; see also cat. no. A42 from Ebla with cat. no. B113 from Hama).

There is no evidence of any official administrative activity in Building P4 (no cuneiform documents were found, nor sealings); at least seven small weights were retrieved, but these do not necessarily indicate anything else than local needs connected with food transformation or craftsmanship activities (Ascalone and Peyronel 2006b, 206–7). There are no significant imports of extra-*chora* goods, save for the materials employed for expensive artifacts in metal and stone, which were limited in number. So-called Syrian bottles in Metallic Ware may actually have been manufactured at Ebla itself rather than being imported from northern Mesopotamia, as it is generally maintained (after all, oil and resins were produced and collected in the western Eblaite territory).

In the case of Building P4, we are not yet able to correlate the archaeological analysis with the textual evidence from the Royal Archives, because of the preliminary state of the study of both kinds of evidence: attractive as it may be, it seems better to postpone any speculations as to the exact kind of authority managing

Building P4. Available data point to a complex in which craftsmanship activities were carried out together with, actually almost along with, the preparation of food, most likely for the needs of the people employed in the building. One wonders whether rations here were allotted to groups of specialists and were processed on the spot before being distributed to them (and, perhaps, to their families too?). On the basis of the bioarchaeological evidence, we can deduce that they were well fed and also with costly items (see the presence of fruit and the young age of the animals butchered). The pottery assemblage, with its variety and its lack of typological concentrations, is functional to the non-exclusive needs required by this system: as a matter of fact, it belongs to a technological horizon that did not reach standardization through a selection of shapes, but rather maintained a great variety in pastes and types, quite coherently matched and kept through time. Among the possible task of these craftsmen, assembling composite objects (made in stone, wood, bone, and gold foil cover, as in L.5005 and L.5009) and inlaid panels (as in L.6272) seems to have been one of the main ones: palatial administration—allocating those artifacts in the palace, temples, or other royal residencies—must have been the ultimate aim of this activity, but we are in no position to hypothesize if there were middlemen (i.e., officials in charge or head of estates and workshops).

We are still far from reaching any detailed knowledge of the actual relation between specialists and central institutions, between highly skilled groups of workers and elite members; nonetheless, Building P4 offers a significant insight into the sophisticated mechanism of production of an early state, one which already shows characteristic and somewhat unexpected features.

NOTES

- 1 At the beginning of the MBA, when an open area was obtained through leveling, the earlier remains of Building P4 were cut at a uniform elevation. About this so-called Square of the Cisterns, see Marchetti and Nigro (1997; 2000).
- 2 Area P South was excavated in 1990 by Rita Dolce, Paolo Maria Dal Soglio, and Gabriele Rossoni. Between 1991 and 1997 (with a break in 1993), the area supervisors have been Lorenzo Nigro and myself, with the occasional assistance during single seasons of Laura Battini, Silvia Festuccia, Anna Rita Lisella, Benedetta Panciroli, Ahmed Serrieh, Sara Tricoli, and Thaer Yarta. The representative of the DGAM through those years was Ryad Saba. Building P4 has been surveyed in 1990 and 1991 by Leonarda De Ninno Scardala, and subsequently by Nigro and myself. Silvia Bernardoni took care of digitizing the plan of Figure 1 here. Most of the vessels have been restored and photographed by Nigro and myself, but Salvatore Tricoli, Federica Di Napoli Rampolla, Ulf Handler, and Erika Rothgangel have also helped with the restorations and Maurizio Necci with the photographs. Pottery drawings have been realized by the Mardikh team of draftsmen and have been digitized by Kevin Ferrari, Liliana Donda, and Giulia Scazzosi. Research in the archives of the Ebla expedition has been carried out, besides by myself, by Panciroli and Scazzosi, with the help of Maria Gabriella Micale, Sara Pizzimenti, and Salvatore Tricoli. To all the people mentioned above and, foremost, to Paolo Matthiae and Frances Pinnock, who always gave me their unfailing support, I would like to express my gratitude.
- 3 The eastern part of Building P4 (excavated 1990–1992) was preliminarily studied by Marchetti and Nigro (1995–1996); see also Matthiae (1993a, 628–34, figs. 4, 10–11; 2010b, 68–71, fig. 27). For some other materials from the eastern sector, see Matthiae, Pinnock, and Scandone Matthiae (1995, nos. 125, 129–131, 133, 144, 181, 210); see Ascalone and Peyronel (2006b, 527, 531, 538, cat. nos. 29, 42, 67, plates IX, XI, XX) for three hematite weights from L.5007 (see also *ibidem*, 523, cat. no. 13, plate VI for a weight from L.5214, although the locus was not given in the publication); see also nn. 13 and 16 below. The samples from Building P4 discussed by Wachter-Sarkady and Minniti in this volume were collected in the eastern sector. Analysis of other bioarchaeological samples from that sector is still in progress.
- 4 The oblong pit in L.5216 and L.5214 certainly derives from a collapsed cistern, because we could reach the lower part of it through the underground network of tunnels below the excavation area. It is likely that also the very large pit F.5243 to the north was due to a massive collapse: its upper fill—the bottom part remains unexcavated—was almost completely sterile, not even containing stones, and several structures around it had been abruptly cut (L.6272, L.5038,

- L.5007, L.5035) or had subsided (notably so L.7209, L.7210, and, partly, L.6272).
- 5 The actual excavated area for Building P4 measures 513 m², not including the outer surfaces L.5331 and L.6829 to the south. In total, Area P South measures 690 m².
 - 6 However, the only stairway of the building, in L.6164, reached a door sill, L.6166, which lay at an only slightly higher elevation than the rooms nearby: the presence of another story, and not just of a roof terrace, is thus not completely proven (the stairway in L.5007 could have reached higher if it continued above the doorway with L.5021). As a matter of fact, in the southernmost rows of rooms several objects were found in the collapsed debris above the floors, suggesting that working activities were also carried out on the upper floor or roof.
 - 7 The northwestern sector of the building was entered from L.5021, but due to the difference in elevation between L.5007 and L.5035, another entrance could have been located in the latter room (which lay higher) from the west. Further, because of incomplete excavation or pitting, it is not clear how L.5216-L.5214, L.6158-L.6298, L.6824, and L.7209-L.7210 could be entered.
 - 8 Thus far the western sector of Building P4 (excavated 1994–1997) has been mentioned only by Matthiae (1998, 562, 564) and was presented by Nigro and myself during the 1997 44th Rencontre Assyriologique Internationale in Venice, Italy. Bioarchaeological samples from the western sector are currently beginning to be further processed within the Ebla Chora Project.
 - 9 In this sense, even very fragmentary Preservation Ware jars were considered as having been present in a given room and could be completed with separate parts of the vessel (see for example the case of L.6298, Figures 32–33); for this same reason, isolated rim sherds lacking attributable body sherds have been in most cases excluded from the present analysis.
 - 10 In Figures 21–37, each sherd bears a string that describes its features in detail: first the sherd number within the bucket of a given year (i.e., TM.94.P.1023/1), then the functional class (SW, SWP, MW, KW and PW, standing for Simple, Simple Painted, Metallic, Kitchen and Preservation Wares, respectively) followed by the technique (W=wheelmade, H=handmade, WH=wheelmade and handmade), the Munsell color and the part of the sherd to which it refers (I=inner, O=outer, C=core, no specification being given if the sherd is of a single color), the firing (H=high, MH=medium-high, M=medium, ML=medium-low, L=low), the grits kind (M=mineral or V=vegetal), their approximate color (b=black, w=white, g=grey, br=brown, r=red, gr=green, p=pink), the grits frequency (>=high, <=low, =medium, ->=medium-high, -<=medium-low) and size (1=small, 2=medium, 3=large, 4=medium-small, 5=medium-large), and, when applicable, the surface treatment (B=burnish, S=slip, W=wash, Sm=smooth) and its location within the vessel (1=outer, 2=inner, 3=outer and inner, 4=outer upper). According to the graphic conventions employed in the figures, painted decorations are rendered in black, dark gray, and light gray, respectively representing the three basic colors of the paint, i.e., black, brown, and red.
 - 11 Unusually enough, the door socket did not lie in L.6276 but in L.6156 itself, whereas that of next room was located inside L.6270 (see Figure 1).
 - 12 Although there is a significant lacuna in L.6298, it seems more likely that an entrance at a slightly higher and now lost level, perhaps by means of a ladder, was located in the eastern wall of L.6158, since the extension to the south of the pebble-filled core of the main passage that ran inside the double wall would otherwise be inexplicable. Also, the position of the door socket inside L.6298 indicates that the door was opened from L.6158.
 - 13 Another Preservation Ware jar with everted neck seems to have been present in the room (Figure 37.55 shows a rim, but a bottom, TM.95.P.292/1, may belong to it too), as well as the bottom of a jar (Figure 37.56).
 - 14 For room L.5005, see Mazzoni (1993, 405 no. 11 (missing), fig. 6, plate 73.2 A46) and Matthiae, Pinnock, and Scandone Matthiae (1995, 382 no. 220). For L.2913, see Mazzoni (1992, 71–72, cat. A21, plates VI, XIV). In room L.5005 another seal impression on a Kitchen Ware globular pot with thickened rim was found (Mazzoni 1993, 405 n. 11 [missing], fig. 10, plate 73.3 A47; Matthiae, Pinnock, and Scandone Matthiae 1995, 381 nos. 215–216), while two other seal impressions on similar pots were retrieved out of context in later levels in Area P South (Mazzoni 1993, 405 n. 12, plate 73.1 A45 and fig. 8, plate 73.4 A48 and fig. 10; the latter is equal to Matthiae, Pinnock, and Scandone Matthiae 1995, 380 no. 214).
 - 15 It should be noted that the total number of ca. 1,400 sherds analyzed in Table 1 does not include all filed sherds nor the unregistered sherds—which were, however, counted on the field—and thus the percentages given here must be considered somewhat preliminary.



Figure 7.2. Aerial view of area P South from south-west (1997).



Figure 7.3. View of Building P4 from north-west (1995).



Figure 7.4. Room L.6158 with materials in situ.



Figure 7.5. Room L.6278 with jars in the south-western corner.



Figure 7.6. Room L.6162 with grinding tables in situ.



Figure 7.7. Rooms L.6270 and L.6276 with materials in situ.



Figure 7.8. Detail of room L.6270 with two lamps (=Figure 7.25:6–7), stone tools and PW water jar bottom TM.95.P.294/5, probably belonging to upper part TM.95.P.294/4 (= Figure 7.26:13).



Figure 7.9. Rooms L.6276 (center), L.6156 (right) and L.6270 (left); one can note some installations on and in the floors made of pressed limestone bits.

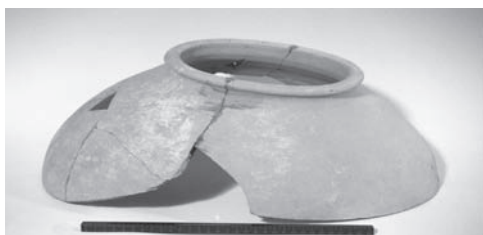


Figure 7.10. PW jar TM.95.P.224/1 from L.6162.



Figure 7.11. SW Syrian bottles TM.95.P.307/17 and TM.96.P.438/1 from L.6298.



Figure 7.12. PW jar TM.94.P.1033/3 from L.6162.



Figure 7.13. PW water jar TM.95.P.304/1 from L.6298.

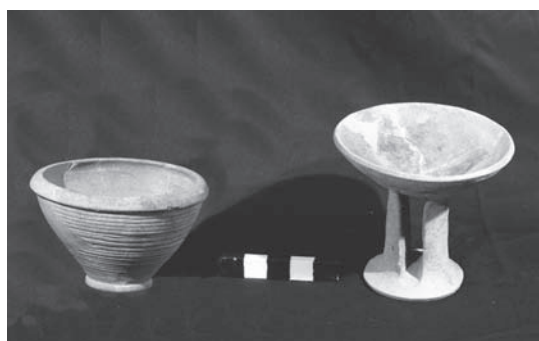


Figure 7.14. SW bowl TM.96.P.450/1 and KW lamp TM.95.P.291/1 from L.6270.



Figure 7.15. SW corrugated beakers TM.96.P.430/4, TM.95.P.296/2, TM.96.P.418/2 from L.6158.



Figure 7.16. SW bowls TM.96.P.425/2, 430/1, 432/1, 430/3 from L.6158.



Figure 7.17. SW jar TM.96.P.432/3 from L.6158.

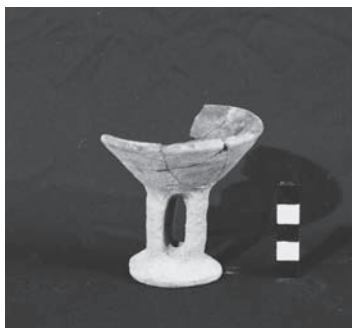


Figure 7.18. KW lamp TM.96.P.296/1 from L.6158.

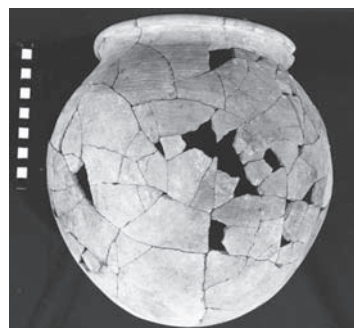


Figure 7.19. KW cooking pot TM.97.P.430/6+425/6 from L.6158.



Figure 7.20. Selected vessels from room L.6158.

L.6162

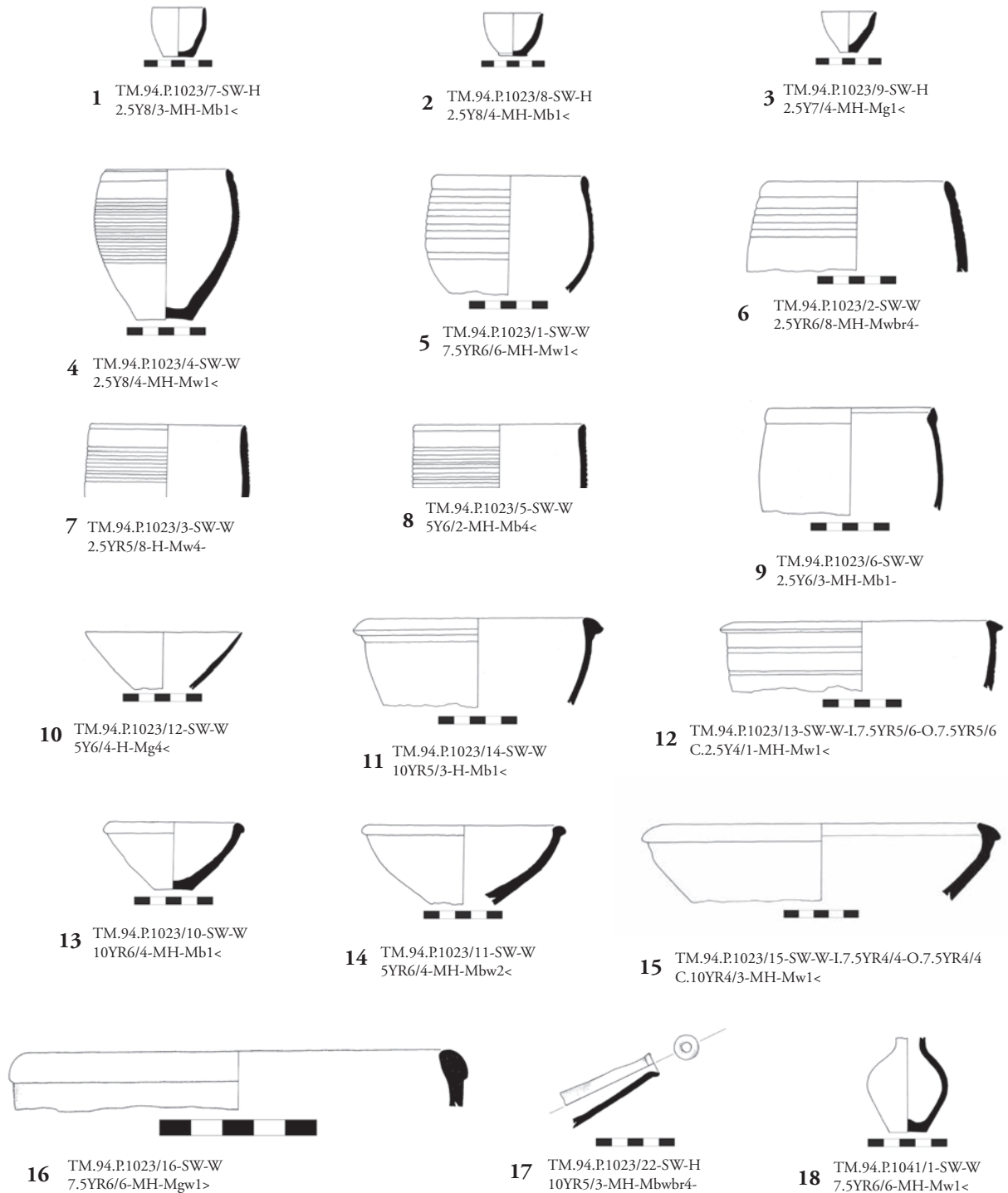


Figure 7.21. SW pottery from room L.6162.

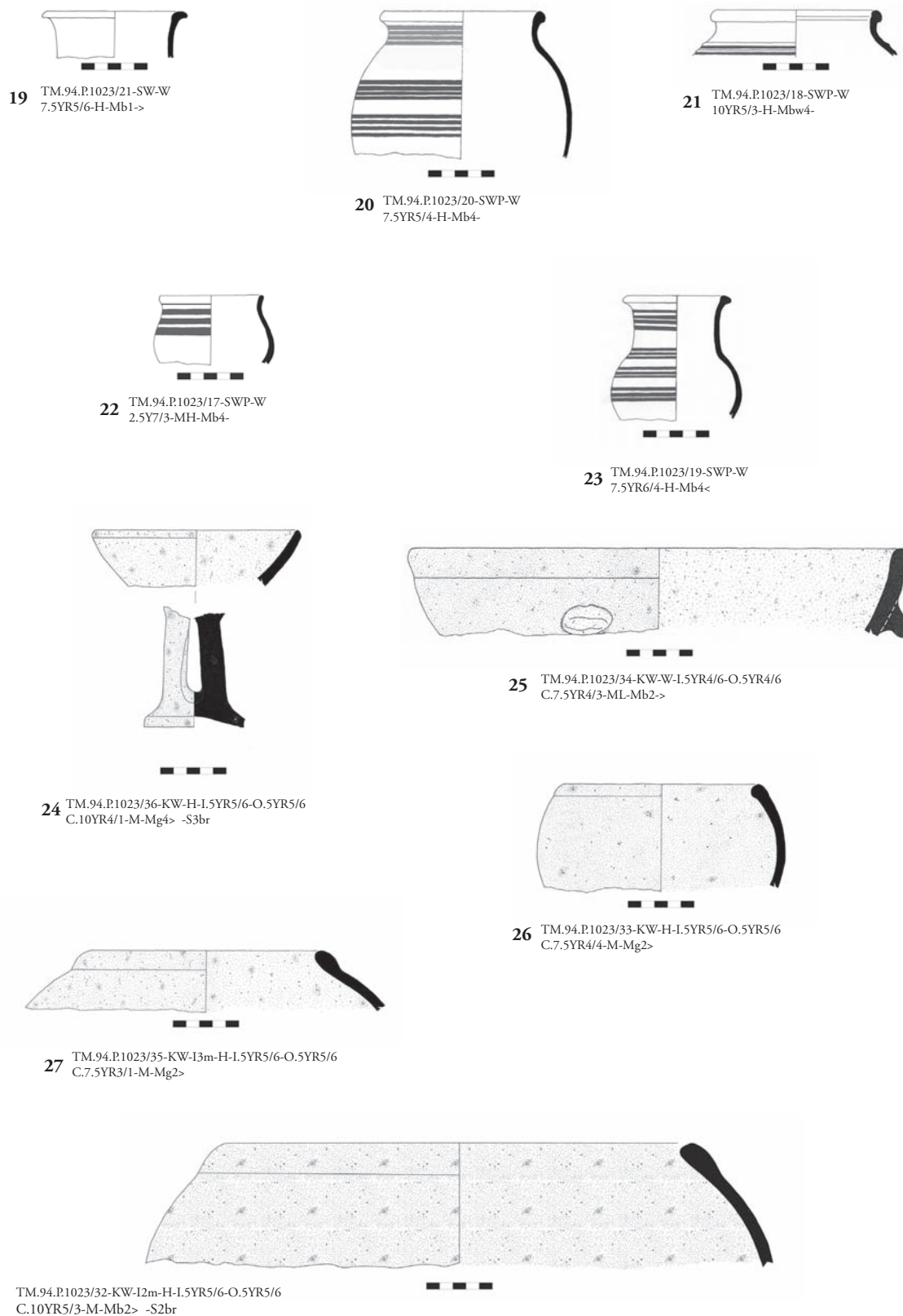
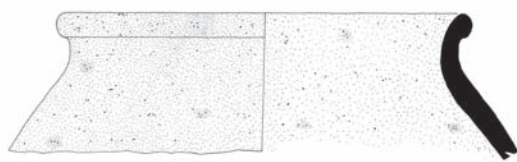
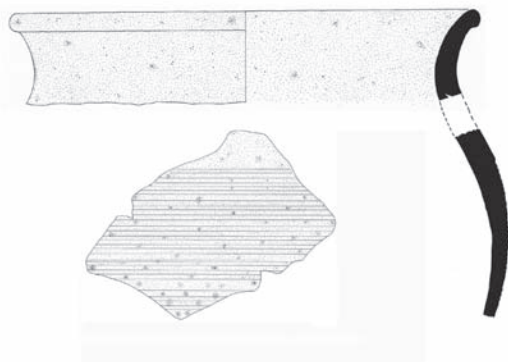


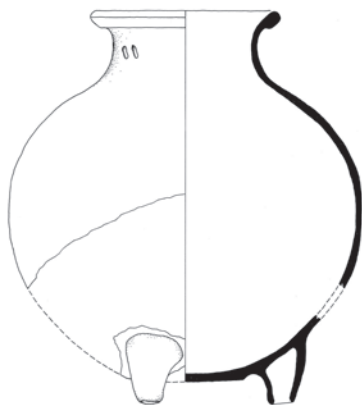
Figure 7.22. SW and KW pottery from room L.6162.



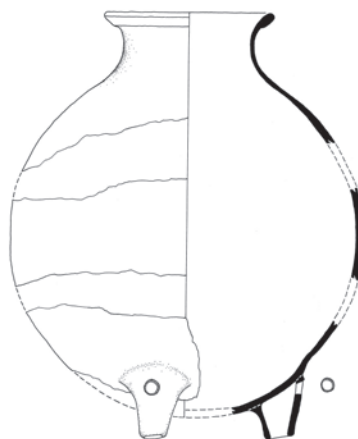
29 TM.94.P.1023/37-KW-WH
7.5YR5/6-M-Mbw1>



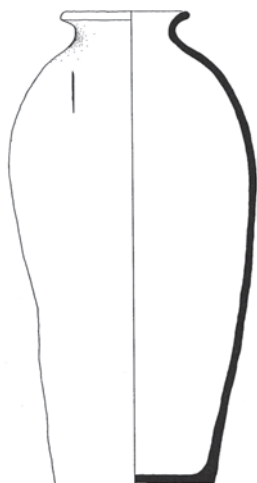
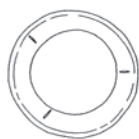
30 TM.94.P.1033/9-KW-WH
10YR6/4-MH-Mg4> -Sbr



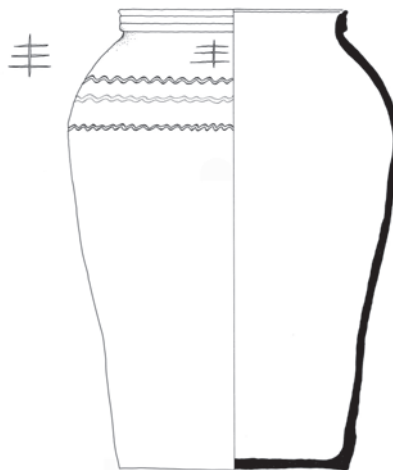
31 TM.94.P.1023/27 PW-WH-L.5YR5/6-O.5YR5/6
C.10YR5/4-H-Mb1- -Sm2



32 TM.94.P.1033/6 PW-WH
7.5YR6/4-H-Mw1<



33 TM.94.P.1033/3 PW-H
7.5YR6/4-MH-Mbw1>



34 TM.94.P.1033/5 PW-WH
10YR5/3-MH-Mw1-

Figure 7.23. KW and PW pottery from room L.6162.

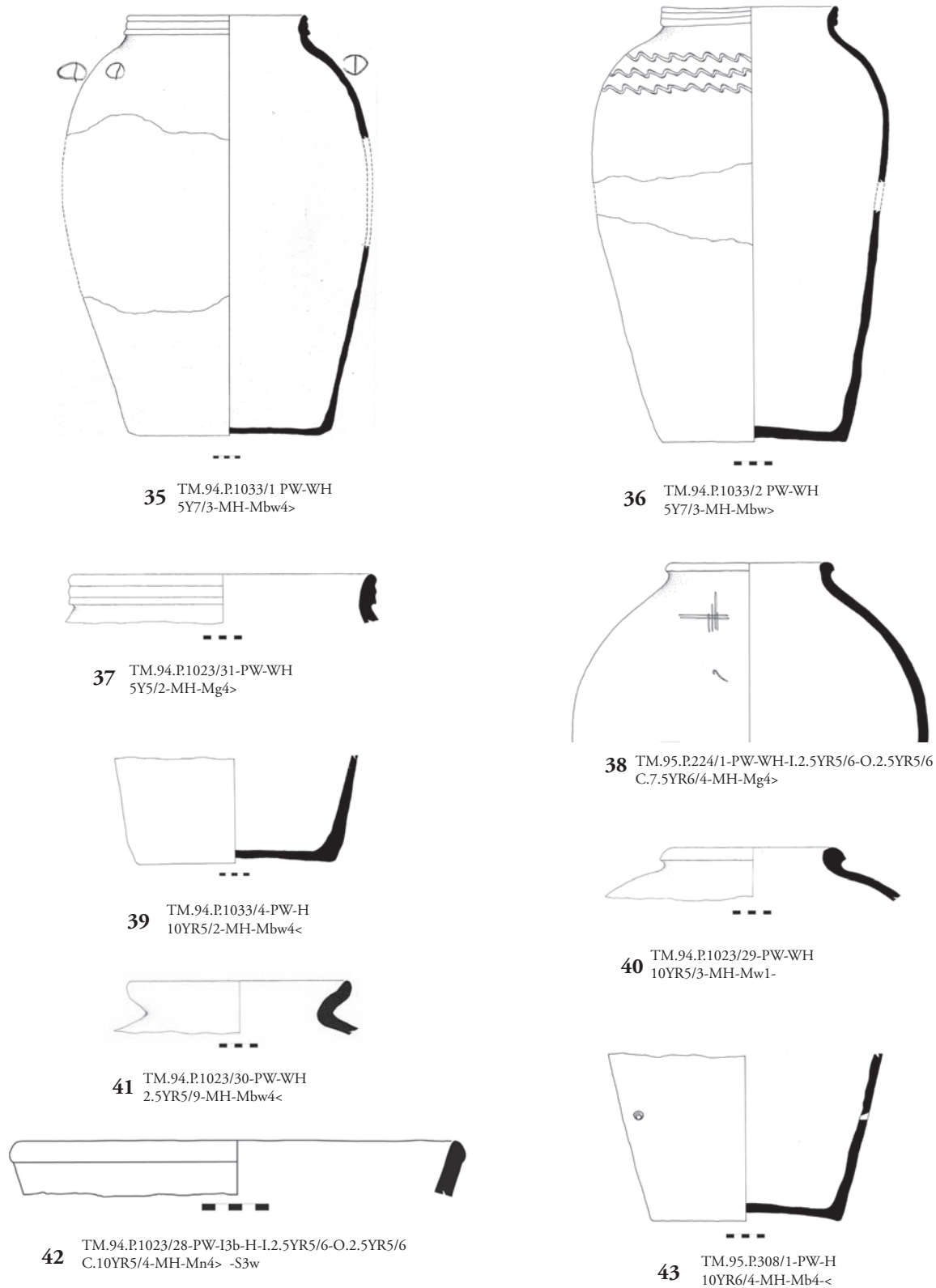


Figure 7.24. PW pottery from room L.6162.

L.6270

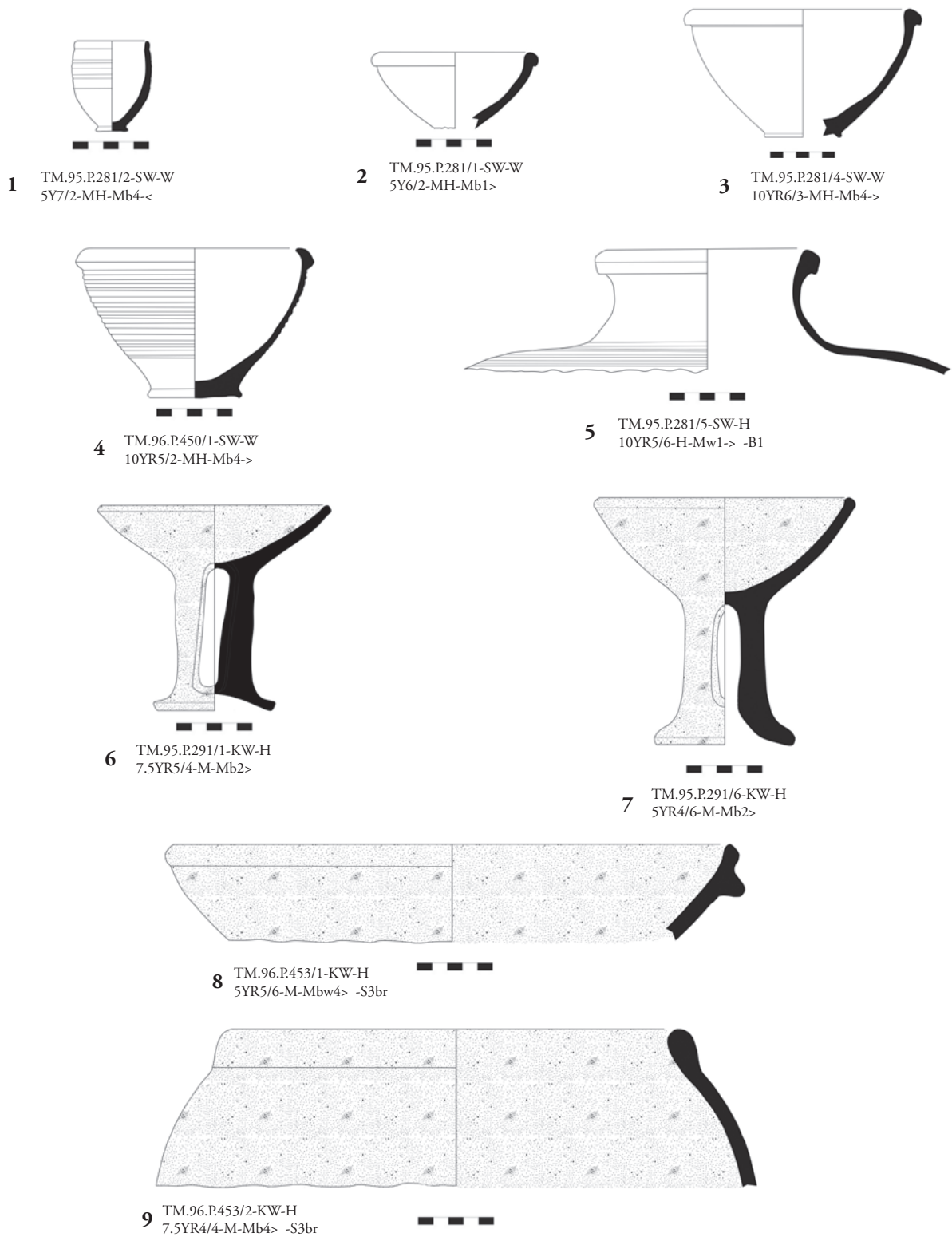


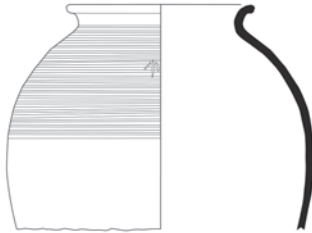
Figure 7.25. SW and KW pottery from room L.6270.



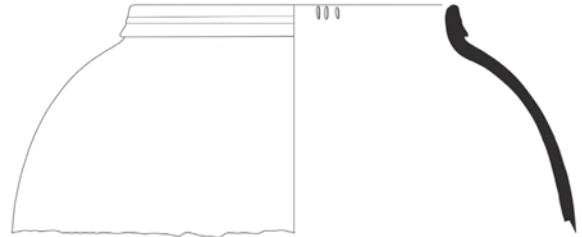
10 TM.95.P.294/1-PW-WH
10YR6/3-MH-Mb4> -W1w



11 TM.95.P.281/6-PW-H-L.2.5YR5/8-O.2.5YR5/8-
C.10YR5/3-H-Mw4< -S1br



12 TM.95.P.291/5-PW-H-L.2.5YR6/4-
O.10YR6/3-MH-Mb4> -W1br



13 TM.95.P.294/4-PW-WH
5Y8/3-MH-Mb1>w2<

L.6276



1 TM.95.P.288/1-SW-W
5YR6/3-MH-Mbr1<



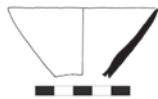
2 TM.95.P.279/1-SW-W
2.5Y7/2-MH-Mbgw1-<



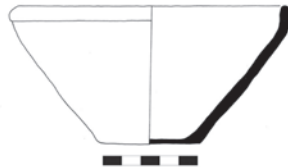
3 TM.95.P.279/2-SW-W
10YR6/3-MH-Mbbr1-<



4 TM.95.P.279/3-SW-W
10YR6/3-H-Mbrg1-<



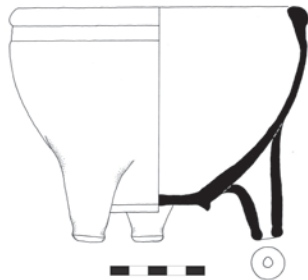
5 TM.95.P.279/8-SW-W
5YR6/6-H-Mbbr1<



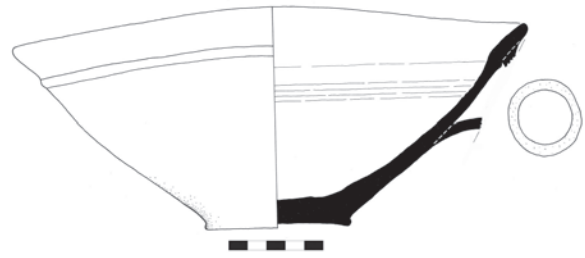
6 TM.95.P.279/6-SW-W
7.5YR7/4-H-Mbr1<



7 TM.95.P.279/5-SW-W
10YR6/2-MH-Mbg1-<



8 TM.95.P.279/4-SW-W
10YR6/2-MH-Mbw1w2<



9 TM.95.P.279/7-SW-W
2.5YR6/6-MH-Mgbr1<

Figure 7.26. PW pottery from room L.6270 and SW pottery from room L.6276.

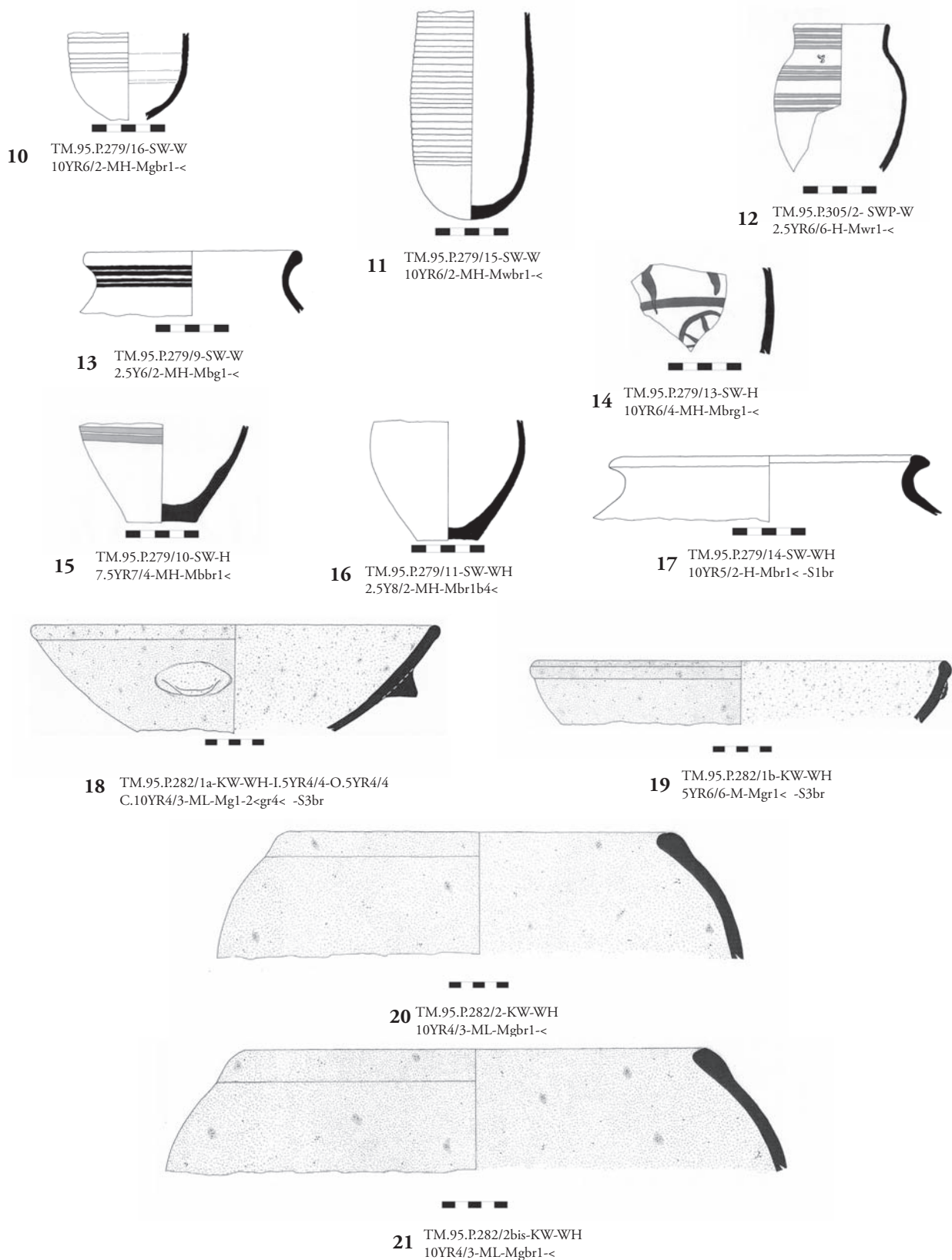


Figure 7.27. SW and KW pottery from room L.6276.

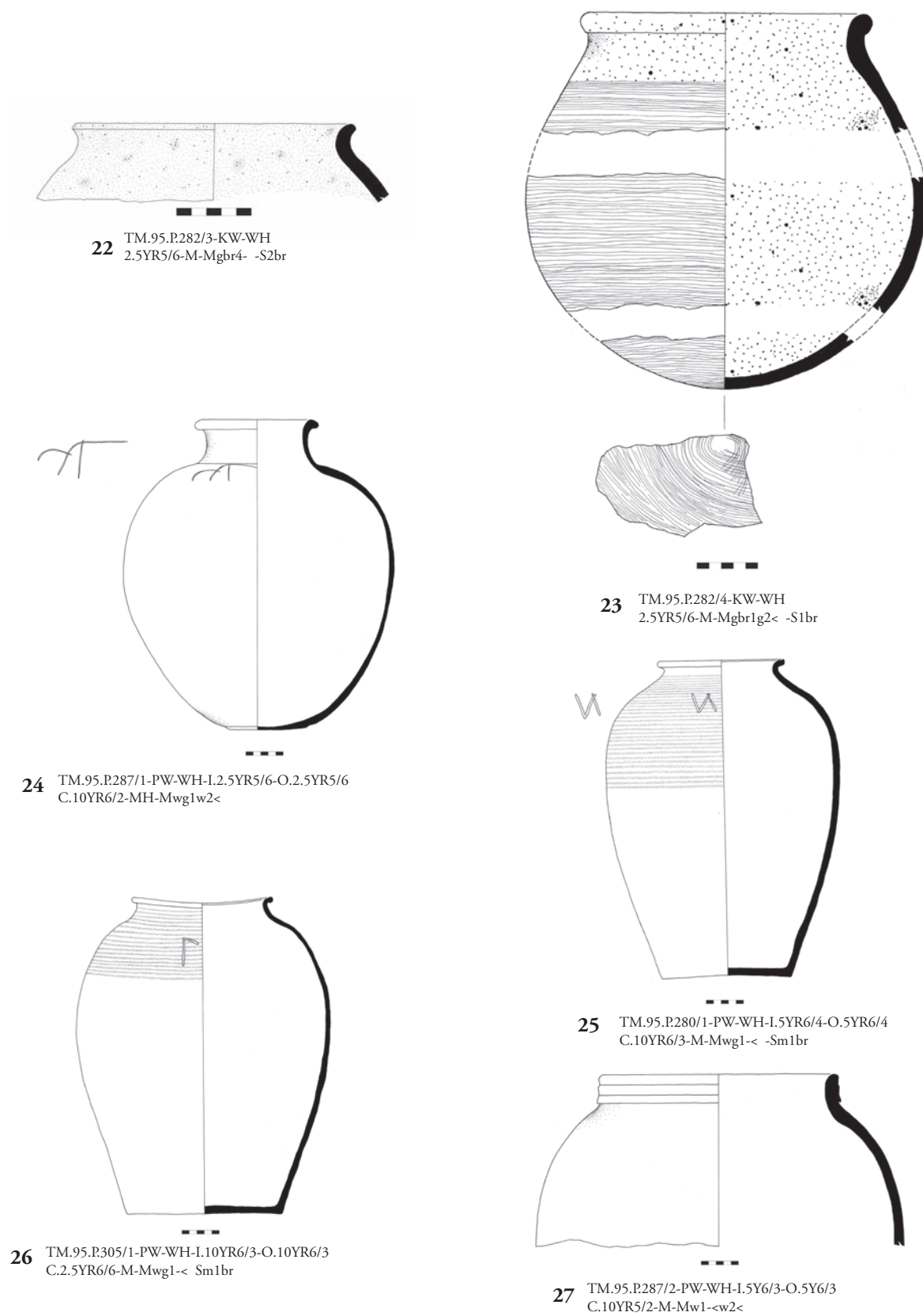
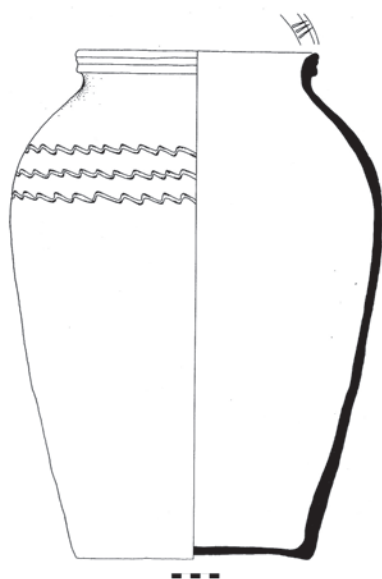


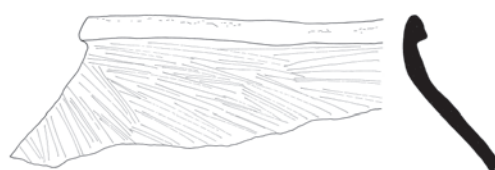
Figure 7.28. KW and PW pottery from room L.6276.



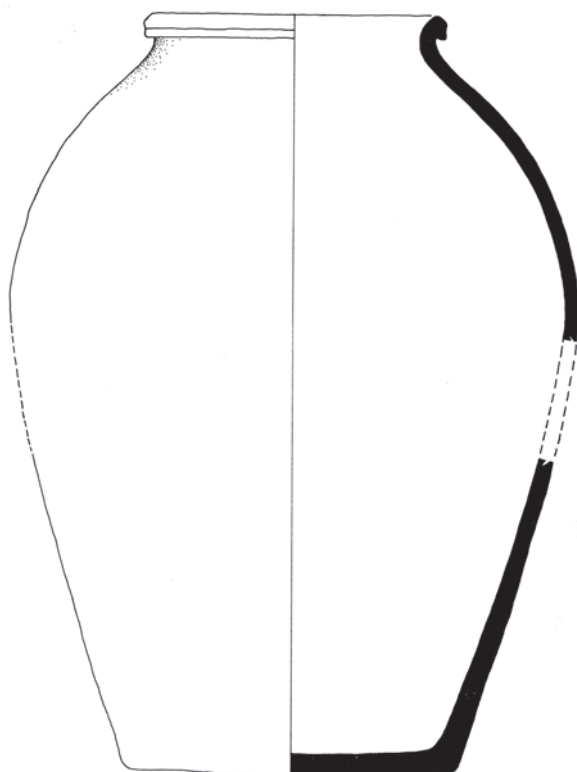
28 TM.95.P.280/2-PW-WH
10YR6/3-M-Mw1-<



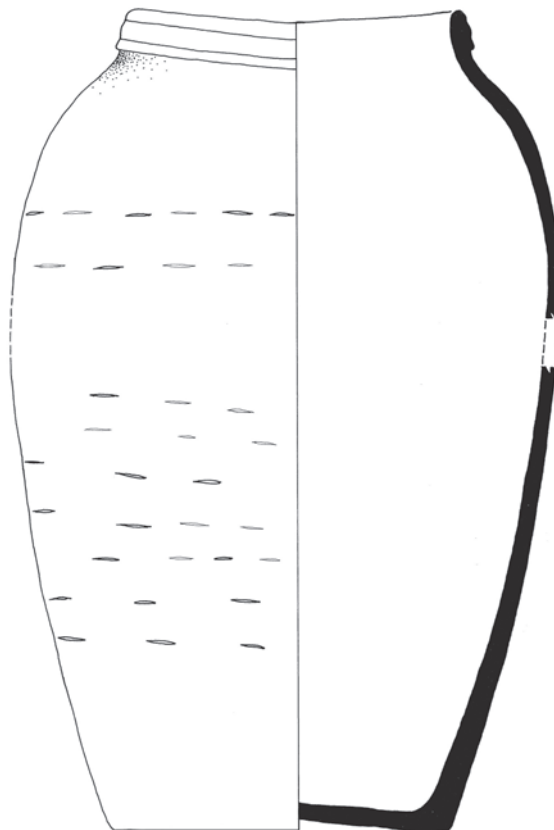
29 TM.95.P.280/3-PW-WH-L.5Y6/3-O.5Y6/3
C.10YR5/2-M-Mwg1-<



30 TM.95.P.280/4-PW-WH
10YR7/4-M-Mwb1-w2<



31 TM.95.P.285/2-PW-WH
7.5YR7/4-M-Mw1-g2<



32 TM.95.P.285/1-PW-WH-L.5Y8/2
O.7.5YR7/4-M-Mw1<

Figure 7.29. PW pottery from room L.6276.

L.6298

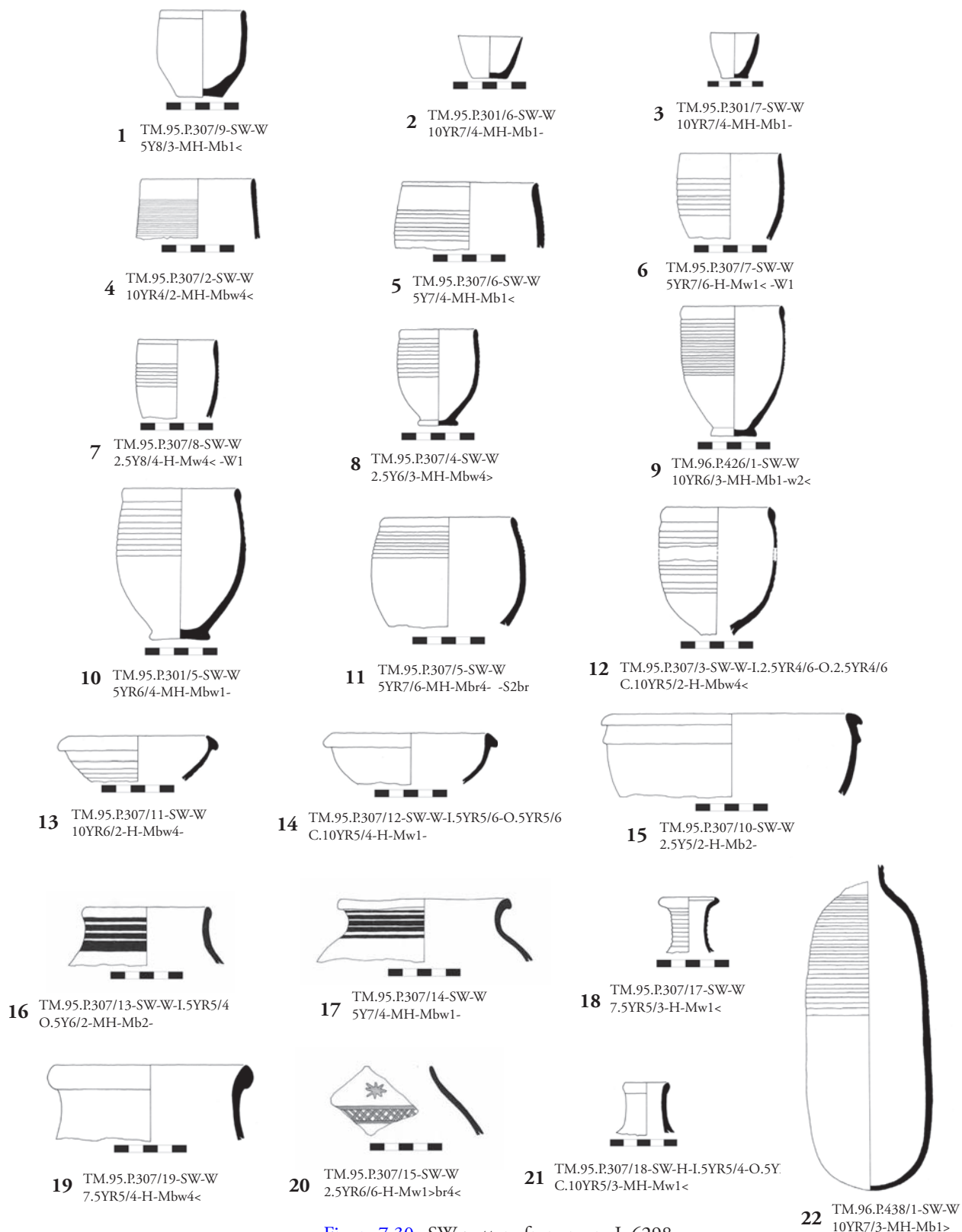


Figure 7.30. SW pottery from room L.6298.

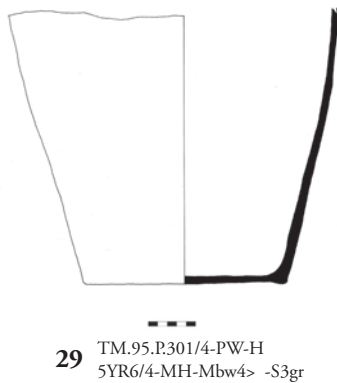
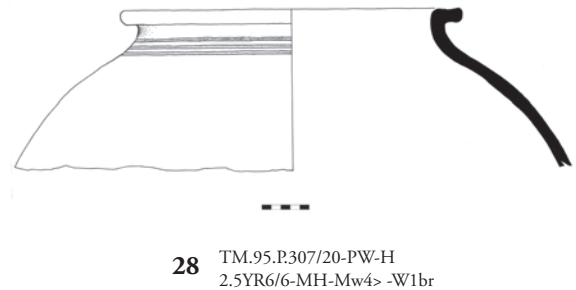
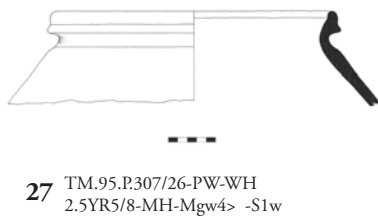
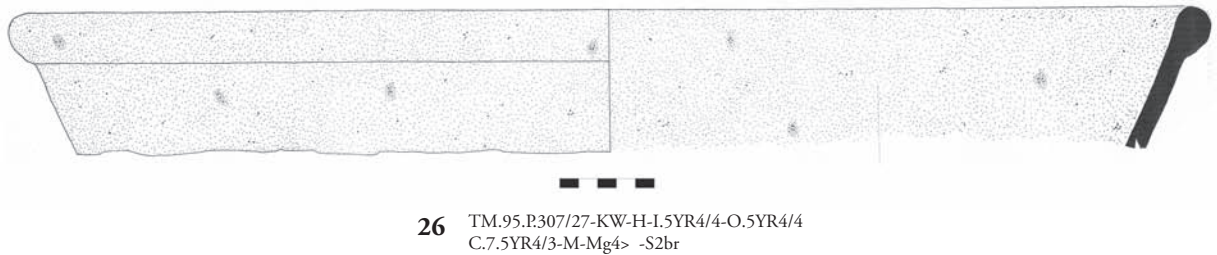
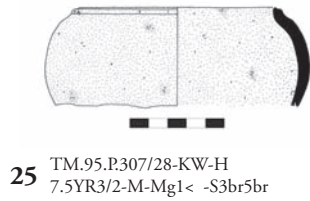
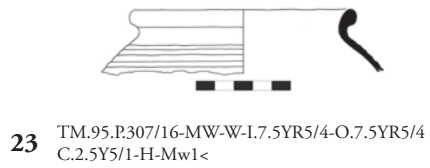
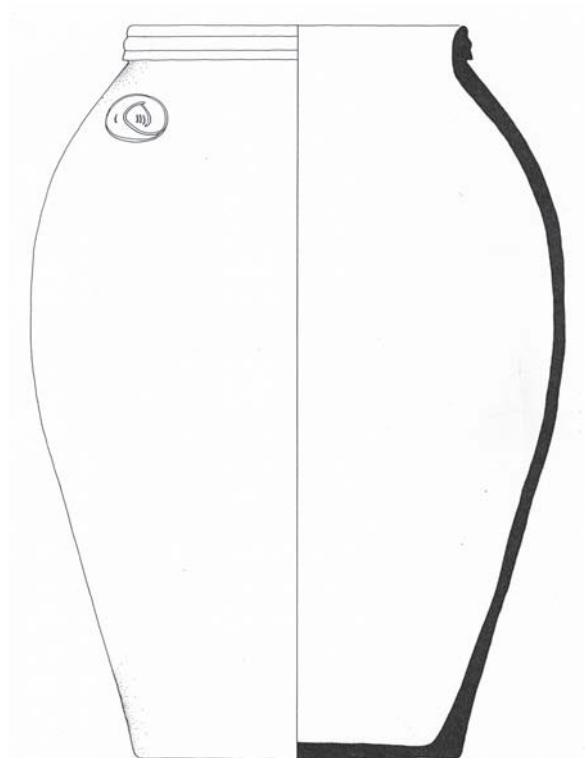


Figure 7.31. Pottery from room L.6298.



31 TM.95.P.304/1-PW-WH
5Y8/3-MH-Mw2>



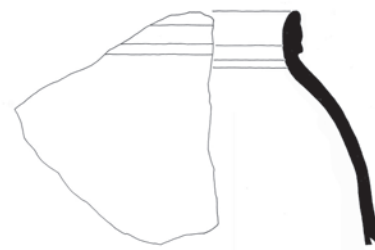
33 TM.95.P.292/1a-PW-WH
5YR5/4-MH-Mw4- -S3w



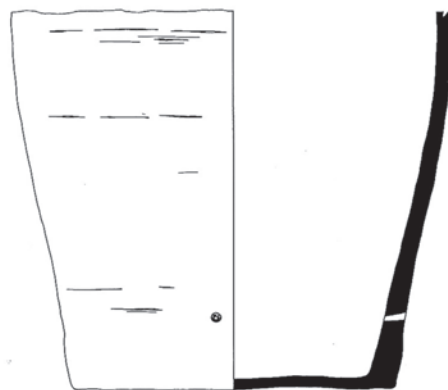
35 TM.95.P.292/1b-PW-H
5YR5/4-MH-Mw4- -S3w



32 TM.95.P.307/22-PW-H
10R4/8-MH-Mb4<



34 TM.95.P.307/23-PW-WH
7.5YR6/3-MH-Mbw4<

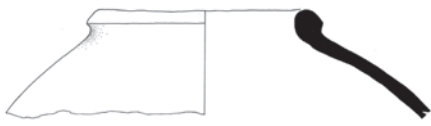


36 TM.95.P.307/24-PW-H
7.5YR6/3-MH-Mbw4<

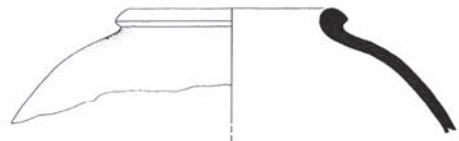
Figure 7.32. PW pottery from room L.6298.



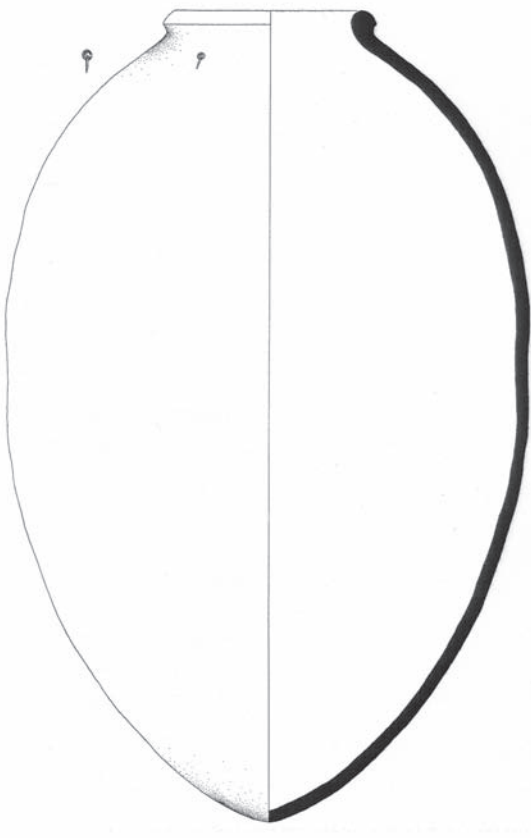
37 TM.95.P.307/25-PW-WH
7.5YR7/4-MH-Mw4> -S3p



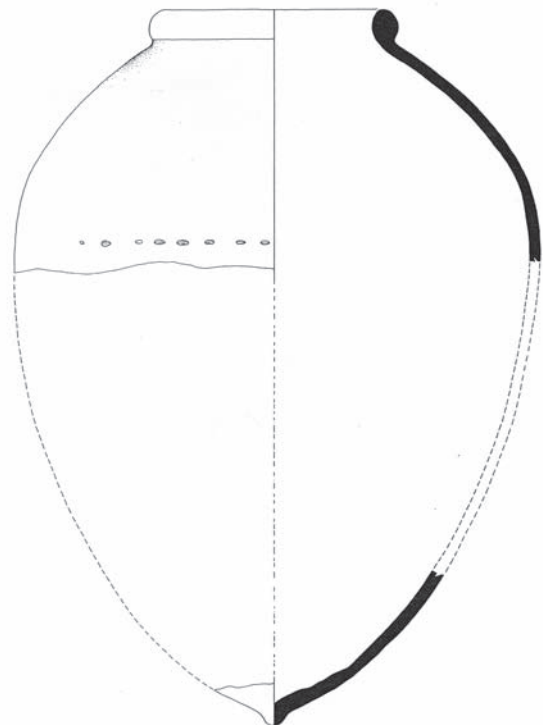
38 TM.95.P.307/21-PW-H-I.7.5YR5/4-O.7.5YR5/4
C.10YR5/2-MH-Mg4>



39 TM.95.P.304/3-PW-WH-I.2.5YR5/8-O.2.5YR5/8
C.2.5Y5/3-MH-Mbw4- -S1br



40 TM.95.P.304/2-PW-WH
2.5Y5/3-MH-Mbw4> -S1w



41 TM.95.P.304/4-PW-WH
5Y7/2-MH-Mb1-

Figure 7.33. PW pottery from room L.6298.

L.6158

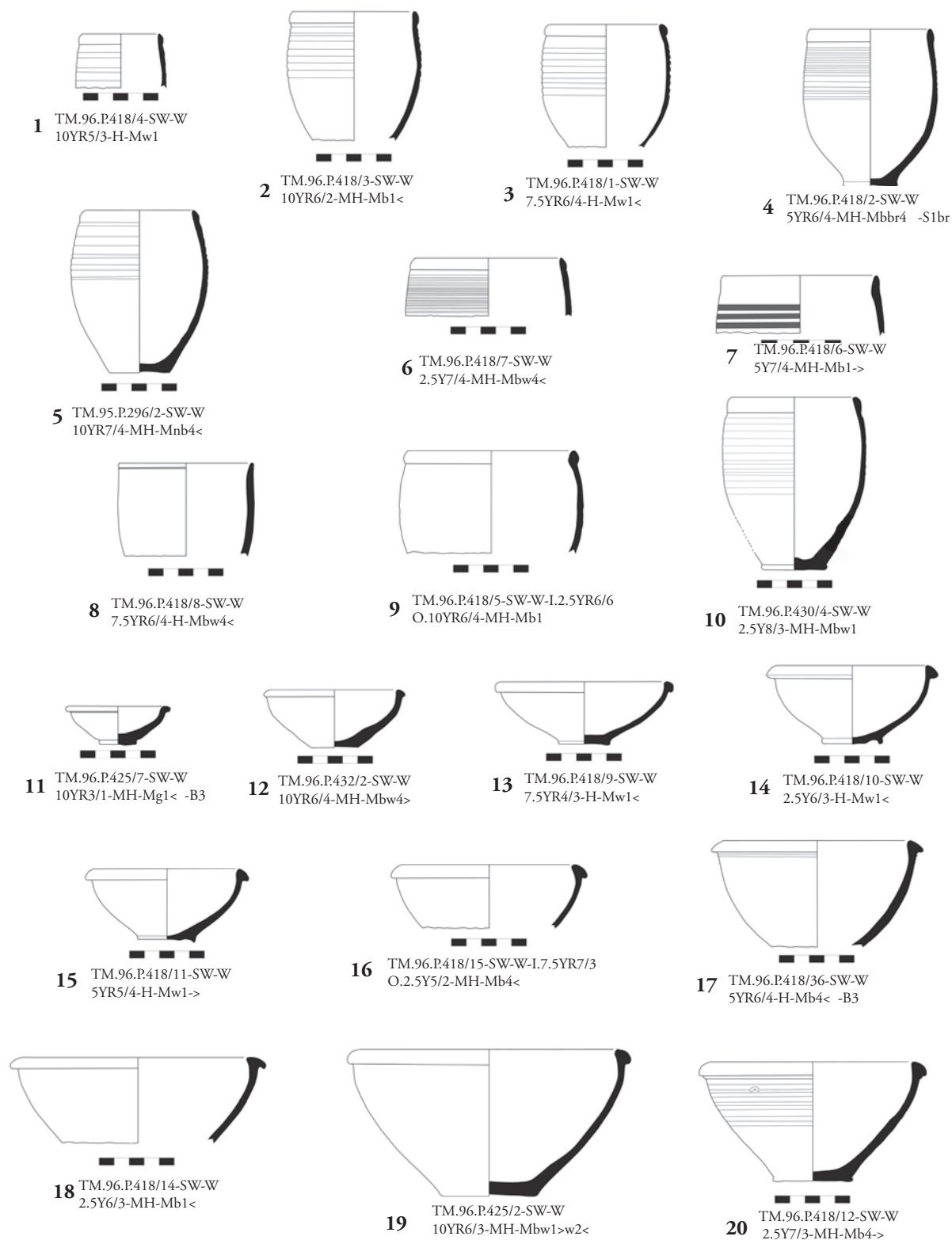


Figure 7.34. SW pottery from room L.6158.

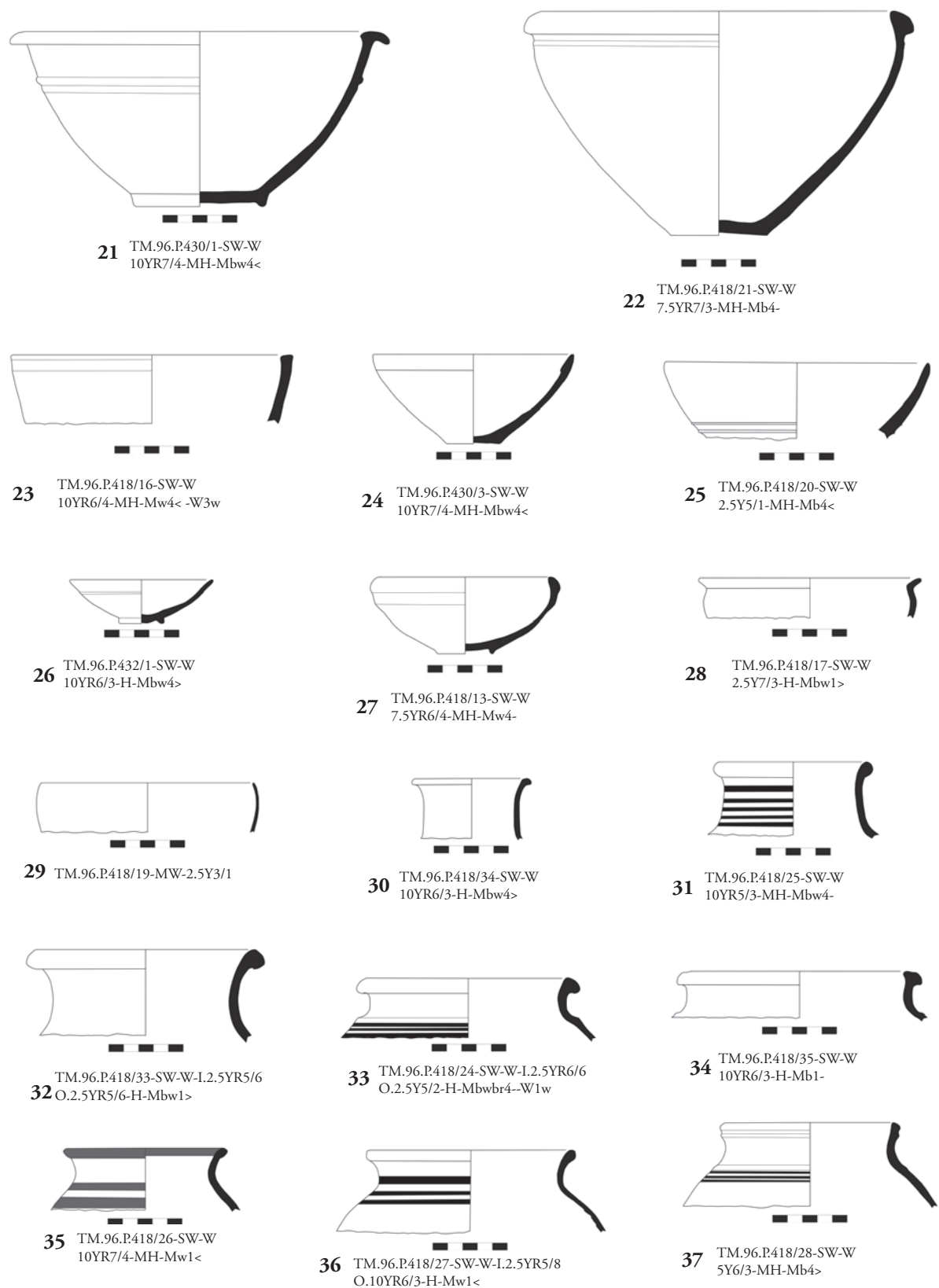


Figure 7.35. SW pottery from room L.6158.

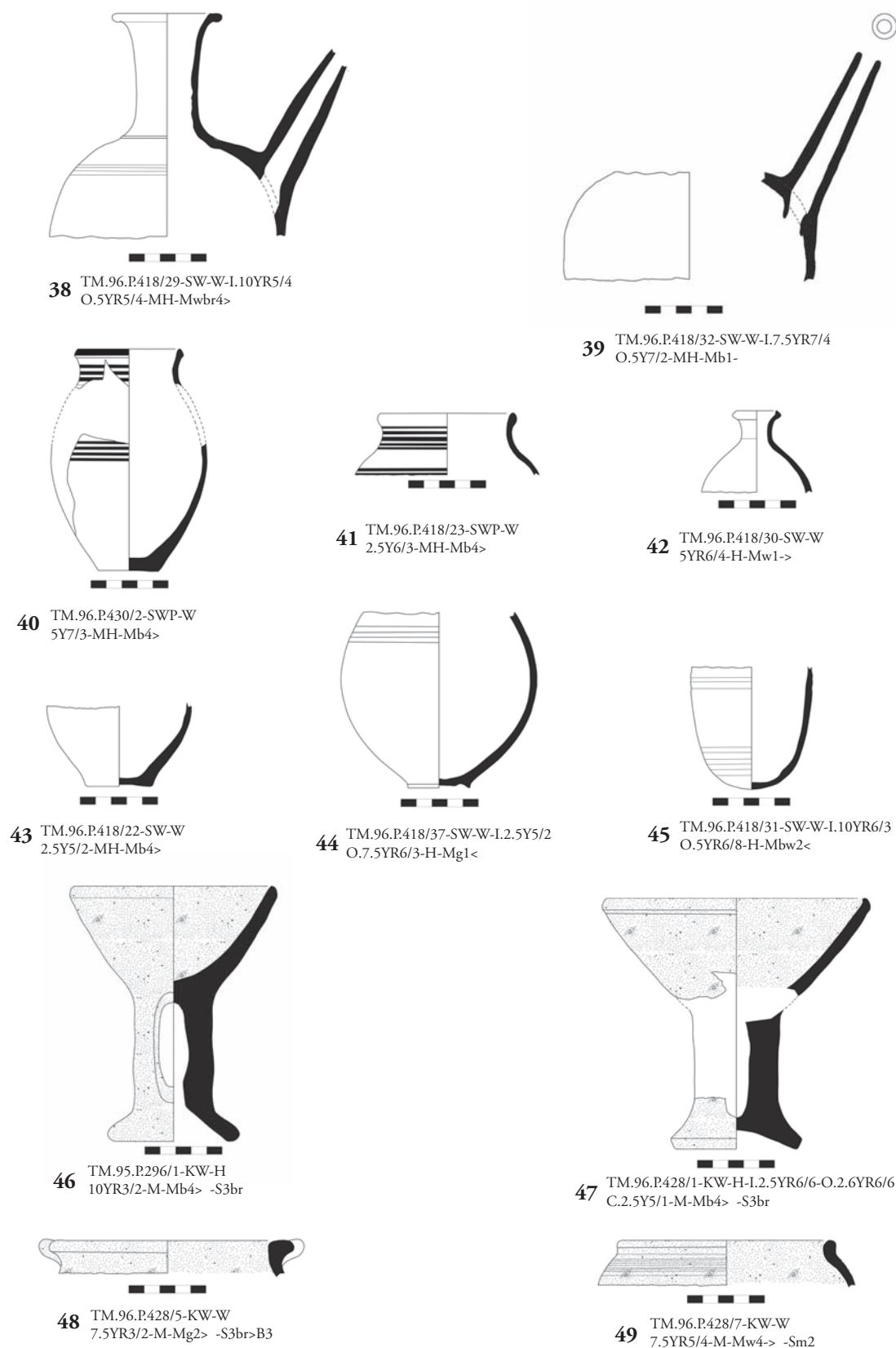


Figure 7.36. SW and KW pottery from room L.6158.

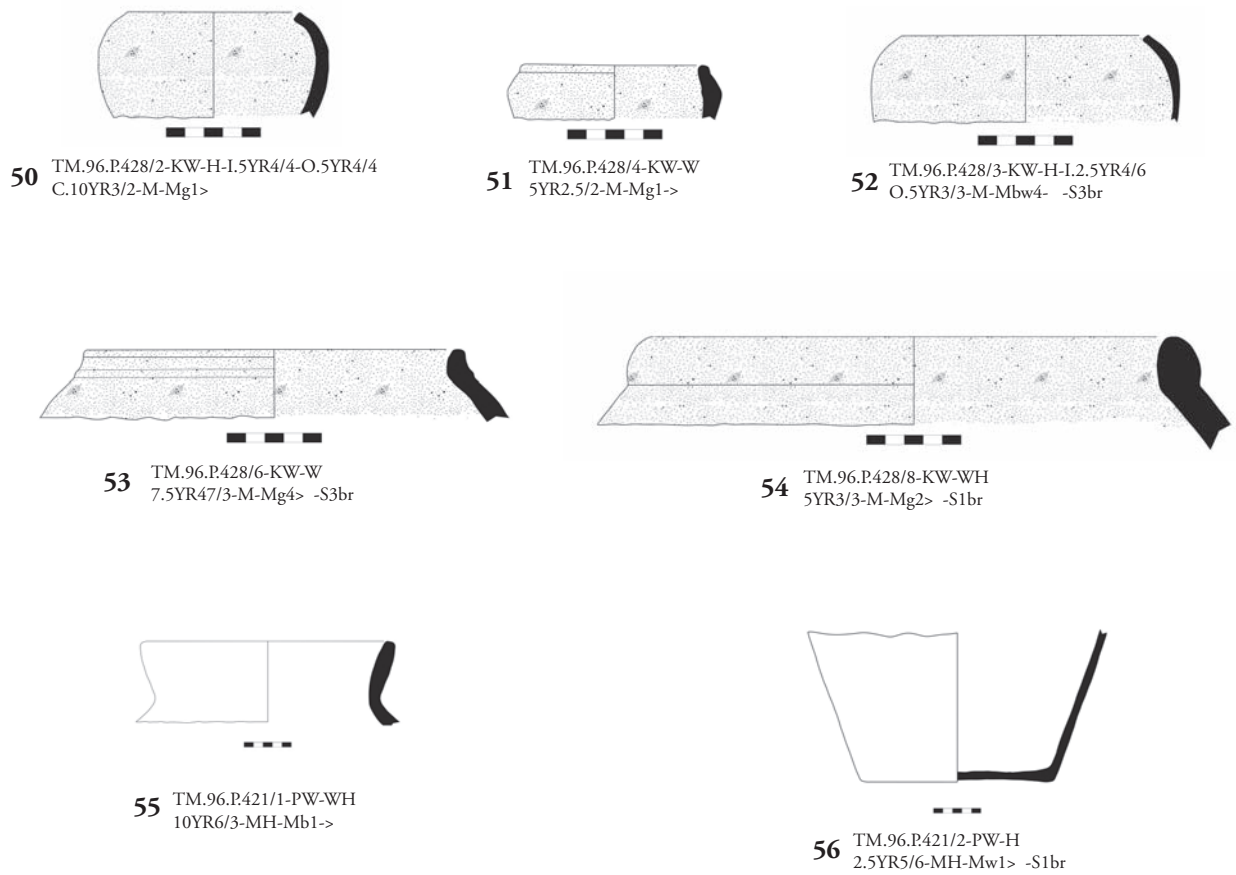


Figure 7.37. KW and PW pottery from room L.6158.

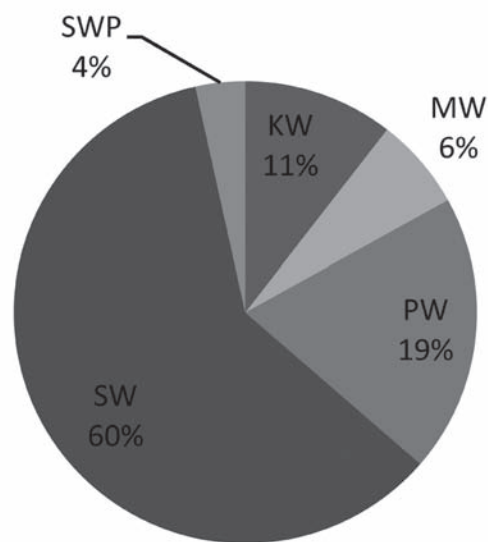


Figure 7.38. Pottery functional classes within the whole ceramic assemblage from Building P4.

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PART 2
Regional Archaeology

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CHAPTER 8

EXPLOITING DIVERSITY

The Archaeological Landscape of the Eblaite *Chora*

S. Mantellini, M.G. Micale, and L. Peyronel

1. INTRODUCTION¹

Since the beginning of the activities of the Italian Archaeological Expedition in Syria (MAIS) of the Sapienza University of Rome headed by Paolo Matthiae, fifty years ago, only some preliminary investigations were carried out to study the archaeological landscape around Tell Mardikh/Ebla. A new program of investigations has therefore been deemed necessary to frame the history of this major centre within its surroundings. The data available from previous surveys carried out in this region have been combined here with those available through remote sensing analyses (see also Galiatsatos and Mantellini, in this volume) and topographical maps, in order to provide a preliminary inventory of the archaeological sites spread across the Eblaite *chora*. This inventory allows a preliminary analysis of the settlement patterns in the region during the Early Bronze Age. A brief overview then deals with the main datasets employed in the detection of sites, according to an approach employed in most of the other archaeological regional surveys in the northern Levant (see Mantellini, in this volume).

2. RESEARCH CONTEXT

The area under investigation by the Ebla Chora Project (ECP) extends for some 3,500 km². The limits of this area have been chosen according to the previous archaeological surveys carried out in the neighboring regions and with the aim to include the different ecological zones that follow

one another in a relatively short topographical distance.

According to these ecological subdivisions, the limestone plain and the basaltic foothills around Tell Mardikh/Ebla represent Area A, the depression of the Matkh Area B, and the steppe and the el-Hass and Shbeyt ranges Area C (see Plate 13:1).

2.1. Area A

Area A is a plain gently sloping from the eastern foothills of the Jebel Zawiyeh, ca. 500 m a.s.l., to the depression of the Matkh, ca. 200–250 m a.s.l. Low annual precipitation (ca. 300 mm), high evapotranspiration, and the local hydrological cycle characterize this microregion's semiarid climate (de Maigret 1981, 5). The territory is marked by the presence of numerous short seasonal watercourses, namely wadis, which run from the slopes of the Jebel Zawiyeh to the Matkh. These streams are characterized by a rapid and marked runoff that causes a high degree of erosion and sediment transportation (de Maigret 1981, 23).

From a geological point of view, this area is formed by limestone in the north and the southwest and basalt in the southeast. The basalt is typical of the hills to the southeast of Ebla, where big blocks of basalt cover the territory making the cultivation of the lands highly difficult (Figures 8.1, 8.2). Although this area was settled in the past, the density of the sites is lower than in the

adjacent limestone area (Figure 8.3). Especially at the foots of the Jebel Zawiyeh, the limestone is covered by a shallow (ca. 50 cm) brown-reddish soil typical of the Ebla landscape and particularly suitable for agricultural production (de Maigret 1978, 85). Moving southward, the limestone turns white and it appears particularly soft, as testified by the presence of several karst cavities and quarries of limestone blocks on both sides of the road Saraqeb–Maarrat en-Numan. The wide exploitation of the locals limestone and basalt for construction can be dated to the ancient times, as attested by the use of stones in the walls foundations and in the architecture at Tell Mardikh/Ebla from the Early Bronze IVA.²

One of the most important issues concerning the history of settlements in the hinterland of Ebla, and in particular the environs close to the capital itself, is the availability of water. Because of the area's climatic, geomorphological, and hydrological features, the only supply of water in this region comes from the underground waters (Wirth 1971, 111–12). Most of the archaeological sites (thirty-two out of thirty-five) of the third millennium B.C. recorded by the de Maigret (1981, 25) in this area are located within the so-called lines of wells (Poidebard 1934, 22–23), beyond which the water table is so deep that water cannot be drawn using the traditional, manual digging techniques. In those places, especially on the hills, as well as in the proper steppe-desertic environment, the suitable alternative for water supply is represented by cisterns. However, both the cisterns and the wells can only provide water for animals, small plots, and domestic purposes, and not for irrigation over a large and extensive scale.

In this regard, de Maigret (1984, 331) was right in observing that the well can be considered the hydraulic structure that better represents Ebla and its territory. On the same matter, Liverani (1965, 109) also noted that the modern villages are placed in close proximity to the ancient settlements in order to exploit the wells excavated in the ancient times. The city of Ebla itself derived its water supply from the excavation of wells and cisterns (Matthiae 1977, 65–66; 1988, 78;

2008a, 114; Ramazzotti 2003), which possibly served also for defensive purposes (Miller 1980, 337). According to the textual information from the Royal Archives, the digging of a new well was something so important to be recorded in the official documents (Biga 2003, 183). Moreover, the king of Ebla was informed of bny new well dug in his territory, probably because the construction of such an important hydraulic structure was under the direct control of the Eblaite state (ibidem, 185).

2.2. Area B

The Matkh depression is an irregular flat marshland extending ca. 28 km along a north–south axis, in which the waters of Nahr el-Quweiq flow (see Plate 13:1).³ A prong of the Matkh Lake proper, called es-Siha, is located at the southern edge, stretching northwest for ca. 5 km (Sweet 1960, 7–12). At its western end, three EBA sites are located (Tell Tuqan, Tell Ras el-Ain, and Tell Sultan), whereas the others EB settlements all lay around the Matkh depression, suggesting that the actual shape of the depression could roughly correspond to the ancient shoreline of the lake.

The lake constitutes the centre of the southern part of the Aleppo Basin (ca. 30 km south of Aleppo), a wide endorheic hydrographic basin delimited by the Jebel Zawiyeh to the west and the Jebel el-Hass to the east (de Vaumas 1957, 198–99; de Maigret 1981, 5–9). It is characterized by the perennial water of the Nahr el-Quweiq and by several seasonal wadis, converging toward the Matkh and reversing most of the groundwater after leakage into a deeper subterranean aquifer, which also drains toward the closed basin. These streams, several of which are now completely dried up, are characteristic of the closed endorheic (or internal) drainage basin and are influenced by the semiarid climate and the geological features of the region.⁴ The most important imbriferous basin in the region is the Wadi Luf, emptying into the marsh in the area of Zammaar, 8 km north of Tell Tuqan, which shows a marked surface runoff, similar to that of the other wadi systems (Wadi Abu Hashish,

Wadi el-Awal, and Wadi el-Mazrwi) (de Maigret 1981, 21–23, fig. 6).

The Matkh depression is characterized by fertile deep gray-brown soils and the groundwater depth is between 35 and 15 m (Figure 8.4) (see Arnoldus-Huyzendveld and Rossi, Ventura and Vignudelli, in this volume). Environmental conditions are therefore particularly advantageous for human settlement, and it is probably for this reason that the early settlements of the region were established around the lake as early as the Late Chalcolithic and Early Bronze I periods (Figures 8.5, 8.6); probably also the development of a hierarchical settlement system at the time of the secondary urban revolution in northern inner Syria (Early Bronze III–IV) can be due to the presence of water and cultivable lands. Although the effective dimensions of the EBA sites and their changes through the third millennium B.C. cannot be ascertained, and only one site has been excavated giving information on EB III and IV periods (Tell Tuqan: see Baffi and Peyronel, in this volume), it is highly probable that an articulated pattern of settlement occupation arose in connection with the peculiar lacustrine environment of the Matkh, supporting the occupation of the surrounding territories (limestone and basalt regions and eastern steppe) (Figure 8.7).

The dense occupation of the Matkh area during the third millennium B.C. might have been related also to the strategic location of the region at the cross of a south–north route, which reaches Aleppo along the Quweiq valley, and a south/southwest–north/northeast route, which connects Ebla to the pass at the southern end of Jebel el-Hass, allowing to reach the Jabbul plain and the Euphrates Valley.

2.3. Area C

Area C is the easternmost region investigated by the ECP (see Plate 13:1). From an eco-geographical point of view, it includes a very large range of different zones and constitutes a crucial point for evaluating the different potentials of land exploitation. The centre of the region is the

low basalt flow of the Jebel el-Hass (*mesas*), which gently slopes to the west on the Matkh Lake and to the south on the depression of the *sebkhas* (the Kharaitsh). The eastern limit of the area is the corridor of Khanaser, which separates the Jebel el-Hass from the Jebel Shbeyt and constitutes the only direct passage to the Jabbul Lake. The erosion and the wadis generate an accumulation of the alluvial soil, which characterizes the Khanaser corridor itself. On the upper part of both the Jebels, the soil is scant and the general condition for agriculture and water collection is unfavorable. The south part of the area coincides with the central depression of the *sebkhas* (the Kharaitsh), the seasonal lakes that fill with water in winter but dry up in summer leaving a salt crust.⁵ To some extent, this prevented a direct passage to southeast and, according to the distribution of the settlements of the area, seems to have forced the development of a path along the south side of the Jebel el-Hass. Contrary to the Matkh (cf. § 2.1), the Kharaitsh does not have a direct affluent from any river. Its water should depend on both rainfall and natural subterranean reserves, even though it is possible that it is the rest of an ancient emission of the Matkh water through the valley where the modern village of Biayeh lies (de Maigret 1978, 85), as also the satellite images seem to suggest (see Plate 13:1). The water here collected could not be used for any consumption purposes, and, even today, the inhabitants of the area declare that the water from their wells is not usable for drinking and food preparation.⁶

Aridity is the clearest and most characterizing climatic feature of the south-southeast section of the entire Area C (see Geyer 2009, 27). With its different zones and natural properties, this area reflects the complexity of human settlement in the region over the course of the centuries. Indeed, the different systems of water acquisition and collection, together with the instability of the water sources themselves, most likely played a fundamental role in the instability of the boundaries of the sedentary settlements—and, in fact, the forms of territorial occupation seem to have adapted to the natural conditions and potentialities of these areas (Geyer 2009, 36). Nevertheless, even if this instability could have

affected the limits of sedentarization, it is clear that the aridity of the near steppe (100–200 mm of annual precipitation) determined a scarcity of fully sedentary occupations and of sites clearly connected to a daily access to water.⁷ Even below 200 mm rainfall isohyets, rain-fed cultivation remains possible only in specific conditions, such as along the wadi bottoms and the *faydas*⁸ (Geyer et al. 2007, 270). Taking into consideration the margins of this part of territory—the basalt heights and the steppes—the lack of a significant presence of settlements can be generally attributed to the likely uncomfortable condition for agriculture and water supplying.

The major archaeological site of this area is Tell Munbatah, located between the ancient basalts flow of the Jebel el Hass to the west and the Jebel Shbeyt to the east (Figure 8.8; see also Plate 14), in a strategic position marking the passage towards the east and, through the Jabbul, towards the Euphrates.

3. DATASETS AND METHODOLOGY OF SITES DETECTION

As demonstrated by the numerous regional surveys carried out in northwestern Syria and adjacent regions, the archaeological field activities significantly benefit from a preliminary detection of the sites by means of topographical maps and remote sensing techniques (see Mantellini, in this volume). This approach was successfully employed also in the case of the ECP in order to provide a preliminary inventory of the sites located within the area under investigation (see below).

The spatial datasets available for this region include topographical maps, satellite images, aerial photos, and digital elevation models acquired at different scales and different times. All the data have then been managed into a GIS framework, set on a UTM projection with datum WGS 84 (Zone 37).

Following the approach of the *Settlement and Landscape Development in the Homs Region Project*, a first desktop assessment of the archaeological record in the Ebla region was devoted to the identification of both “Known

Sites” and “Potential Sites” (Philip et al. 2005). The former denote features securely matching with archaeological sites. In most cases they are tells that also have a toponym associated with the feature on the map. The latter are features detected on maps and/or on satellite images that might belong to archaeological remains, whose nature however can only be established through a ground visit.

3.1. Topographical Maps

The topographical maps actually available for the area covered by the ECP are those produced by the Service Géographique des Forces Française du Levant of the Institut Géographique National, by the Russian Military and Civil State Topographic Service, and finally by the Syrian authorities (Table 8.1).

3.1.1. French Maps

The scale of the French maps ranges from 1:50,000 to 1:500,000. The first edition of the maps on a 1:50,000 scale is dated between the 1930s and the first half of the 1940s, that is the end of the French mandate in Syria. The 1:50,000 scale map of Hama West, for example, has been published in 1931 after the 1930 topographical survey. The map of Khan Sheikhun has been published in 1944 using the aerial photographs of March 1943. Some maps of the last edition, like Khan Sheikhun, have legends in both French and English. The series on a 1:200,000 scale were drawn between 1944 and 1945 after a 1935–1936 survey, and then updated in 1949–1950.

The series of French maps on a 1:50,000 scale proved extremely useful for archaeological purposes, since they reported the name and the symbol of both the typical mound-shaped sites (tells), which usually belong to pre-Classical times, and of the ruins (*khirbet* and *r.nes*) of cities and villages dated to the Hellenistic, Roman, and Byzantine periods. In addition to the good scale of representation, the French maps are dated before the major landscape transformation caused by urban development and the extension of agricultural surfaces, which often resulted in the destruction of the archaeological tells.

The French maps were acquired by the Italian Archaeological Expedition in Syria (MAIS) as early as the beginning of the archaeological research at Tell Mardikh. Both Pericoli Ridolfini (1965) and de Maigret (1978) widely used these maps in order to detect the sites on the field, whereas Liverani (1965) apparently did not.

3.1.2. Soviet Maps

The Soviet maps are also a precious source of information concerning the archaeological landscape of many areas of the ancient Near East. These series are remarkable for their precision and level of detail, and they can be seen as the output of “the most comprehensive global survey ever attempted and created detailed, accurate maps of practically every country in the world” (Davies 2005, 26). The projection of these maps is the Gauss-Krueger, a version of the UTM system based on Pulkovo 1942 datum and Krassovsky 1940 ellipsoid.

Since the topographers mapped all the anomalies on the ground, all the archaeological tells have been recorded, especially on the big-scale maps (1:10,000 and 1:25,000). Moreover, the topographers were aware that the several mounds widespread across the territory corresponded to archaeological remains, and therefore they assigned to the anthropic hills the symbol meaning “burial mound”, “kurgan” (i.e., typical funerary mounds), and “mound”, often associated with the toponym “tell” (US Department of the Army 1958, 16; Psarev et al. 1986, 367 and plate XIII).⁹ In other cases, there are different place names indicating the possible presence of an archaeological site: *bug*. (*bugor*), meaning mound, hillock, and *g*. (*gorodische*), referring in Russian archaeology to the citadel of an ancient settlement or, more generally, to the settlement itself.

The Russian maps available for the area of investigation included within the ECP represent an excellent tool for a preliminary location of the archaeological sites. According to their scale, the series available are three: 1:100,000, 1:200,000, and 1:500,000. These maps are easily purchasable through the web at a very low price.¹⁰ However,

the resolution is low, a watermark is added over each map, and all the maps must be reprojected from the Gauss-Krueger system into the UTM WGS 84 system. The same series have been made available at a high resolution by UC Berkeley, and the sheets related to the ECP area were kindly provided by the *Fragile Crescent Project* of Durham University.

The representation of the tells is of course related to the scale of the map (Figures 8.9, 8.11). Thus, on the 1:500,000 scale maps only the major tells are recorded, whereas on the 1:100,000 scale maps almost all the tells are drawn. However, Tell Sheikh Mansur (EC 005) and Tell Ghilash (EC 045) are missing on the 1:100,000 scale map but reported on the 1:200,000 scale map. Differently from the French maps, only some ruins of the Classical settlements are reported on the Russian maps. They are not marked by any symbol but are recognizable by the place name *khirbet*.

3.1.3. Syrian Maps

This is a series on a 1:50,000 scale published between the end of the 1970s and the beginning of the 1980s, after the aerial photographic coverage of the Syrian Air Force in the 1960s and a topographical survey in the 1970s. The contour lines are at 10 m. As demonstrated for the Tell Hamukar Survey in northern Syria (Ur 2010, 47–48), this series reports the name of the archaeological remains as well as the typical mounded sites, making these maps very useful for detecting the sites prior to the field survey.

3.2. Satellite Images

The datasets of satellite imagery employed within the ECP differ according to the scale, year, and spatial resolution of the frames acquired.

3.2.1. Landsat

The Landsat Thematic Mapper (TM) sensor generated medium-resolution imagery that provide a general base map for northwestern Syria and Upper Mesopotamia, including the whole area under investigation by the ECP.¹¹ It shows very clearly the cultivated areas and the main

ecological zones that characterize this region, in particular the dark basalt hills to the south of Ebla, the depression of the Matkh, and the salty marshes of the Kharaitsh in the southeastern edge of the region. The orthorectified Landsat TM Mosaics image (Id MTN-37-35_LOC) was generated by Landsat 4-5 imagery acquired between April 1987 and September 1990. They have been made available for free by the United States Geological Survey (USGS) through the Earth Explorer service (<http://earthexplorer.usgs.gov/>).

The ECP area (Path 174, Row 35) is also covered by Landsat Enhanced Thematic Mapper Plus (ETM+) Mosaic acquired between August 1999 and August 2001 and provided either through the above mentioned USGS service or the Global Land Cover Facility (GLCF) at the University of Maryland (<http://glcfapp.glc.f.umd.edu:8080/esdi/index.jsp>).

3.2.2. Cartosat-1

Cartosat-1 is panchromatic satellite imagery acquired by a satellite launched in May 2005 by the Indian Space Research Organization (ISRO) at Ahmedabad. The high-spatial resolution of 2.5 m fits very well the need to generate an accurate digital elevation model for the area of investigation: thus, a stereo-pair dated to the end of August 2009 was acquired for that specific aim. The imagery cover a square area of 27.5 x 27.5 km, and a systematic GPS topographical survey is planned in order to acquire the ground control points for the creation of a digital elevation model. Meanwhile, Cartosat-1 has been used to evaluate whether or not the tells detected on the topographical maps and CORONA satellite imagery are still preserved.

3.2.3. WorldView-2

WorldView-2 is a high-spatial resolution image provided by Digital Globe® that has been little used for archaeological purposes until now. The spatial resolution is 50 cm in the panchromatic band and 1.84 m in the eight multispectral bands. However, the cost is still expensive and many regions of the world are not hitherto covered. A selected task acquisition was therefore planned

for the ECP. An area of 317 km² was chosen in order to include at a reasonable cost the major sites of Tell Mardikh/Ebla and Tell Tuqan and their near surroundings. The image was acquired on 22 August 2011. The high spatial resolution makes this image suitable for the detection of tells and potential archaeological features, the classification of physical and cultural features, and vegetative analyses.

3.2.4. CORONA

The series of CORONA satellite images are perhaps the most important source of territorial information in many parts of the world, including the Near East. Numerous archaeological projects in Syria have therefore adopted this imagery in order to detect tells, off-sites, anthropogenic features hidden beneath the ground, and landscape transformations.¹² For details on the application of CORONA satellite imagery within the ECP, see Galiatsatos and Mantellini, in this volume.

3.2.5. Google™ Earth

The region of Ebla is well covered by satellite imagery provided by Google™ Earth. These are CNES/Spot® images of 2004 covering the steppe and the easternmost zone of the ECP; DigitalGlobe® imagery of 2011 for the area between Tell Mardikh/Ebla and Tell Tuqan; and GeoEye® imagery of 2011 for the area west of Tell Mardikh. The images are dated between 2011 and 2012, and the spatial resolution allows an updated evaluation of the state of preservation (preserved/destroyed) of the archaeological mounds previously detected by means of topographical maps and CORONA satellite imagery. In recent years, Google™ Earth has shown all its capabilities for archaeological purposes (Ur 2006), and has proven to be an effective tool for a preliminary desktop assessment prior to a ground control. Moreover, Google™ Earth provides the most updated, and free of charge, environmental representation of the investigated area. For example, this imagery shows the easiest and shortest path to reach the archaeological sites as well as their exact location. For this reason, the preliminary 2010 fieldwork

(cf. § 5.1) was carried out using as a basemap a mosaic of Google™ Earth Pro frames combined with the older Soviet topographical maps. Each frame has been acquired at a big scale (ca. 1:10,000) by using MapWindows GIS and the Shape2Earth plug-in. Every single scene captured is already georeferenced in the UTM-WGS 84 projection system and thus it is automatically mosaicked with the others when included into the GIS framework.

3.3. Aerial Photos

Aerial photos covering the area between Tell Mardikh/Ebla, Tell Tuqan, and the Matkh, have been acquired only recently and their georeferencing is currently in progress. However, they provide some preliminary information concerning the detection of tells and off-sites (Figure 8.12). The photos were acquired at a 1:18,000 scale by the Syrian Air Force on 1st October 1967 and they were probably used to create the Syrian topographical map series of the 1970–1980s (cf. § 3.1.3).

3.4. Digital Elevation Model (DEM)

The Digital Elevation Model currently in use within the ECP is the Aster GDEM Version 2, released free of charge by the Japan-US ASTER Science Team in October 2011 (<http://www.gdem.aster.ersdac.or.jp>). Until an accurate DEM based on Cartosat-1 and Ground Control Points is created (cf. § 3.2.2), this is the most reliable source available for elevation data. The DEM resolution is 30 m, and this instrument was very useful in generating the contour lines in order to provide a preliminary evaluation of the archaeological sites based on their elevation (see Table 8.8).

4. EARLY SURVEYS

The archaeological surveys in the environs of Ebla can be summarized in the two major works carried out by Liverani in 1964 and de Maigret between 1971 and 1974. However, some of the sites around Tell Mardikh/Ebla and Tell Tuqan were also included in the surveys of the Jazr

Plain carried out by Ciafardoni and later by Mazzoni. An investigation of the Classical sites of Jebel el-Hass and Jebel Shbeyt was done by Haase in 1974, whereas the steppes located at the southern margins of the Ebla territory were investigated by Geyer.

4.1. Liverani (1964)

M. Liverani (1965) conducted the first exploration of the region of Ebla at the very beginning of the long-term expedition of the Sapienza University of Rome at Tell Mardikh. Since a systematic archaeological study of this area was missing at that time, a preliminary survey was planned in 1964 around the major settlement of Tell Mardikh. Besides carrying out an inventory of the sites, this preliminary research aimed at seeking the presence of sites dated to EB IV-MB I, which was already attested as the main phase of occupation at Tell Mardikh (Liverani 1965, 107). The attention was focused on the pre-Classical occupation: therefore, the tells within a distance of ca. 10–15 km from Tell Mardikh were visited and briefly described (Liverani 1965, 110–18). Size, height, and main morphological features were gathered and pottery was collected at each site in order to provide a chronology.

The sites recorded were eleven (Table 8.2). All but Tell Afis (EC 004) are included in the area of investigation of the ECP, and all the sites, except for Tell Debes (EC 047), were also surveyed later by de Maigret (cf. § 4.3).

Based on the archaeological data and textual information available at that time, Liverani attempted to frame the results of his survey within an historical perspective. According to his interpretation, the area of Tell Mardikh was settled irregularly over the time. The ceramic fragments collected during the fieldwork show a high density of settlements between the EB and the MB, when the major settlements of Tell Mardikh, Tell Tuqan, and Tell Afis extended over a remarkable stretch of land. That period seems to be characterized by three main developments: the urbanization process, the influence of the Mesopotamian culture, and the fortification of

the medium and major settlements (Liverani 1965, 119–20). At the beginning of the second millennium B.C., the area was abandoned due to an inner crisis caused by the demographic increase and the need of new lands for agriculture. Afterwards, between the eighteenth and thirteenth century B.C., the region showed a seminomadic occupation. The early Iron Age marked a new development of the region, which will reach a new peak of flourishing in the Hellenistic and especially the Roman period (Liverani 1965, 123–33).

Notwithstanding the few sites recovered and a short period of work, Liverani's survey is worth noting for several reasons. Firstly, he argued that the main modern route between Aleppo and Hama was the same used in ancient times, since the major sites tend to be arranged along it. Secondly, the wells were the main form of water supply in this region, in the 1960s like in the past, and this explains why the modern villages are usually located either beside or at the foot of the ancient tells. Finally, and most significantly, at the time of Liverani's investigation Ebla was still unidentified archaeologically, but in the written sources it was mentioned as a major centre that apparently disappeared after holding a prominent role during the Akkadian and Ur III periods. Liverani (1965, 122) argued that this same chronological trend characterized the pottery collected at Tell Mardikh and Tell Tuqan, which showed a period of flourishing between the end of the third and the beginning of the second millennium B.C. followed by abandonment.

4.2. Pericoli Ridolfini (1964)

In the same year as Liverani, Pericoli Ridolfini (1965) conducted a specific survey aimed at identifying the Classical sites in the region of Tell Mardikh, focusing in particular on the Roman and the Early Islamic periods. This investigation was limited to the surroundings of Tell Mardikh, using the topographical maps on a 1:50,000 scale of the Service Géographique des Forces Française du Levant (cf. § 3.1.1).

In a short field survey of the region, Pericoli Ridolfini attested the presence of twenty-six sites of the Classical period that served different purposes, such as settlements, military fortresses, and religious centres. Most important is the information about the existence of structures dug into the local limestone, some of which were still used by the local inhabitants and which could have been exploited in the ancient times either as cisterns or little warehouses.

Underground rooms are reported in eight of the visited sites and this is a very important issue in relation to the likely uninterrupted exploitation of local water resources like wells and the practice of digging local limestone for economic and domestic purposes, possibly since the Bronze Age.

4.3. de Maigret (1971, 1972, 1974)

The most consistent and systematic archaeological survey of the pre-Classical settlements located in the lower Aleppo basin was carried out by the Italian Archaeological Expedition at Ebla during three campaigns in 1971, 1972, and 1974 under the responsibility of de Maigret (1974, 1978, 1981).

The boundaries of the surveyed site are defined to the west by the foothills of the limestone ridge of Jebel Zawayeh and to the east by the foothills of Jebel el-Hass and Jebel Shbeyt; to the north the Matkh region reaches the Jebel el-Is, but the area surveyed included only the northern margin of the Matkh depression, and to the south the limit is marked by the basaltic plateau dividing the Aleppo and the Hama basins (de Maigret 1981, 5, fig. 2, plate I). On the base of environmental and geomorphological features, de Maigret distinguished seven subregions, identifying fifty-four sites with pre-Classic materials collected on the surface of the mounds (de Maigret 1978, 85, fig. 2): the area of the basaltic hills to the south (sites nos. 1–12), the eastern foothills of Jebel Zawayeh to the west (site nos. 14–21), the area to the west of the Matkh depression (sites nos. 22–30), the Matkh marshland (sites nos. 31–39), the western foothills of Jebel el-Hass to the east and of the Jebel Shbeyt to the southeast

(sites nos. 40–48), the Hadidines hills (sites nos. 49–52), and the Kharaitsh *sebkhas* (sites nos. 53–54).¹³

The exploration of the region has been carried out according to a survey methodology aiming at carrying out an inventory of pre-Classical sites. The military maps elaborated by the Service Géographique des Forces Française du Levant were used to find and locate the tells, and the archaeological data were crossed with the information available from the 1:1,000,000 geological maps of Syria and Lebanon (Dubertret 1962). Some Landsat 2 imagery of the northern Syria dated to October 1977 were also used during the investigation.

The chronology of the visited sites was determined mainly according to diagnostic pottery sherds collected on the surface.¹⁴ The materials were collected without topographic distinctions, although in some cases the presence of pottery from later periods (Ellenistic-Roman and Islamic) retrieved in specific part of the mound is indicated. Thus, we cannot determine if the occupation of a site in a specific chronological phase corresponds to the actual size of the mound. Moreover, the presence of a consistent Middle Bronze phase in several sites makes it difficult to ascertain the extension of the EB occupation.

The main objective of the regional survey was mapping all the mounds in order to assess the settlement development from the Late Chalcolithic to the Achaemenid periods. Seven distributive maps of archaeological sites were elaborated at the end of the survey, according to seven chronological phases (de Maigret 1978, 86–94, figs. 10–16): Late Chalcolithic–Early Bronze I–III, IVA, EB IVB, Middle Bronze (I–II), Late Bronze, Iron Age, Persian (Table 8.3).

A more detailed study of two sites located in the steppe to the southeast of the Matkh depression (Tell Munbatah, EC 003, and Tell Sabkha, EC 044) has also been published (de Maigret 1974). Both settlements have been interpreted as fortified sites dating to EB IVB, but probably already occupied during EB IVA, on the basis

of the topographic preliminary analysis and the evaluation of the pottery gathered during August 1971 and October 1973. According to de Maigret, those sites had the predominant function to control the commercial strategic route running at the interface between the basaltic plateau to the north and the desert steppe to the south, which gives access to the Jabbul plain and, beyond it, to the Euphrates valley (cf. § 5.3).

Another important task of the survey was to define the geomorphology and hydrology of the region in relation to the settlement distribution (de Maigret 1981, 5–26). The most interesting result on this matter is the interdependence between the availability of subterranean water and the position of the sites. All the settlements are located below 500 m of altitude and a large number of them (thirty-two sites) within the so-called region of the wells (see Poidebard 1934, 32–33), where the reddish-brown soils are predominant. In this area, where only dry farming was possible, it was very difficult to manage a surplus of primary products in a wide redistributive pattern of economic development, despite the variety of agricultural resources cited in the cuneiform texts from Ebla. On the contrary, the wealth of the territory resided in the grasslands, which could be exploited for an extensive husbandry of sheep, goats, and cattle (see de Maigret 1984).

4.4. Haase (1974)

In 1983 Haase published the results of a survey conducted in 1974 focusing on the area of Jebel Hass and Jebel Shbeyt, which, according to his assumptions, lacked of a proper archaeological investigation (Haase 1983, 69). Indeed, Haase emphasized that this circumstance affected the conclusions on both the chronology and the history of the settlements, which were based on partial data. By that time, the dataset of the French maps on a 1:200,000 scale was used for the fieldwork. In order to reconstruct the settlement pattern in relation to the landscape and architectural remains, the survey team collected any kind of artefacts and, even when

the team gave the sampling up (for example, they did not collect the flints found), the finding spot was equally registered (ibidem, 71). According to Haase, some circumstances and places should deserve a particular and wider analysis, such as the occurrence of Halaf pottery in flat sites almost always related to Roman and Byzantine ruins (i.e., Gubb el-Amm),¹⁵ the presence of megalithic monuments, some graves without any trace of pottery, and the Hellenistic-Roman sacred complex at Khirbet el-Maaz. However, since the recognizable traces of settlements become more and more rare to the west of the Jabbul and Jebel Shbeyt and towards the steppes to the south, Haase maintains his focus on the Roman-Byzantine history of the area and its monumental vestiges.

With regard to the early settlements, besides the above-mentioned Halaf pottery, Haase (ibidem, 74) reported Neolithic and maybe Bronze Age pottery in many other places where the late ruins clearly hide the early levels of occupation. In particular, he noticed only three artificial hills that testify to the long continuity of the settlement itself: Tell Tat (EC 099) to the north of Jebel Hass, Tell Anbara (EC 051) on the Jebel Hass, and Tell Munbatah (EC 003) to the southeast of Khanaser. Nevertheless, even in the only map of the places and ruins visited and registered published by Haase, there is neither trace of a clear chronological difference between the settlements nor a chance to distinguish the places of the alleged early settlements, with the exception of the three above mentioned tells.

4.5. Ciafardoni (1985–1986)

Some of the sites around Tell Mardikh were visited in the mid-1980s by Ciafardoni, during the survey of Tell Afis hinterland (cf. Mantellini, in this volume § 2.16). According to the subdivision of the area of investigation, the southeastern and northeastern quadrants cover a large part of the territory around Ebla. In the southeastern sector the sites recorded are Tell Sheikh Mansur (no. 12, EC 005), Tell Jalas (no. 13, EC 045), Tell Tuqan (no. 14, EC 002), Tell Mardikh (no. 15, EC 001), and Tell Qumhane

(no. 16, EC 097). EBA pottery was of course documented at Tell Tuqan and Tell Mardikh, and a few fragments of EB IVA pottery were also found at Tell Gilash (Ciafardoni 1992, 41–46). In the northeastern sector, the survey covered the sites of Tell Bajer (no. 10, EC 095), Tell Nabariz (no. 11, EC 061), and even Tell Hader (no. 9, EC 036), albeit the latter was slightly outside the proper area of investigation. Bronze Age pottery was found only at Tell Bajer, and dated to EB IVA-B (ibidem, 40–41).

5. FIELD ACTIVITIES OF THE 2010 SEASON

In the perspective of a long-term survey of the territory of the Ebla *chora*, which was planned for the Spring 2011 and is currently suspended, some preliminary investigations were carried out in 2010 in selected spots in order to have a first archaeological evaluation of the three areas included in the ECP.

5.1. A First Survey across the Ebla Region

A short exploration of the whole ECP area was carried out in September 2010 in order to acquire archaeological and environmental information useful to plan the fieldwork of the following seasons. It also represented an opportunity to evaluate the usefulness of the spatial datasets available for the forthcoming field activities.

The survey was carried out by car, visiting the main tells representing the three areas of research and some of the minor sites around them. A special attention was devoted to the areas already investigated and described by Liverani (1965), Pericoli Ridolfini (1965), and de Maigret (1978). Along with Tell Mardikh/Ebla (EC 001), six sites were surveyed in Area A: Tell Sheikh Mansur (EC 005), Tell Aghar (EC 006), Tell Mahti (EC 007), Tell Kursiyan (EC 008), Tell Khatri (EC 009), and Tell Debes (EC 047). This preliminary overview confirmed the observations provided by Liverani and Pericoli Ridolfini in the 1960s in regard to the sites' location and state of preservation. Tell Debes (EC 047), for example, was described by Liverani (1965, 116) and Pericoli Ridolfini (1965, 142) as extremely difficult to identify

on the field because it was almost destroyed and covered by the expansion of the homonym village. It is therefore presumable that the tell was destroyed and its existence remains only in the toponym. Area A is the most settled in term of villages, and talking with the local inhabitants, who know about archaeological features and abandoned ancient hydraulic structures spread across the territory, proved extremely useful.

The investigation in area B focused on six tells around the Matkh. The major one is Tell Tuqan (EC 002), and some other minor tells are located very close to it: Tell Ras el-Ain (EC 026), Tell Fakhar (EC 027), Tell Kalbe (EC 028), Tell Sultan (EC 029), and Tell Abu Mughahar (EC 038).

Finally, three sites were explored in area C: Tell Munbatah (EC 003), Tell Mase (EC 039), and Tell Sabkha (EC 044). Tell Munbatah was the object of a systematic survey and it is thus described in detail separately (cf. § 5.3).

In contrast with what occurred in other parts of central and northwestern Syria (see Mantellini, in this volume), this preliminary investigation demonstrated that the archaeological landscape of Ebla was affected only marginally by urbanization and agricultural expansion. Most of the tells identified on the maps and satellite images seem to be still in place and in a good state of preservation. Moreover, the tracks followed during this exploration to reach the major places are, with only minor changes, the same drawn in the 1980s on the Soviet map on a 1:100,000 scale. This territory can be therefore investigated by using these maps for the general observations and exploration, together with the recent Google™ Earth satellite imagery for an accurate survey at site scale.

5.2. The Survey around Ebla

A first preliminary off-site survey has been carried out to the south and to the east of Tell Mardikh/Ebla in October 2010 in order to investigate the area immediately outside the fortified town, between the southwestern and northeastern city gates (Plate 13:2).¹⁶ The presence of a rampart

running from south to north at a distance of ca. 250 m from the outer foot of the eastern fortification wall could be related to an extension of the site in this area, although the dating of the structure is elusive since no diagnostic sherds have been retrieved from its surface. This seemingly defensive structure, called Tell Abyad by the local people, is a rampart 527 m long, ca. 10 m high, and between 40 and 67 m thick at the base (Figure 8.13). A modern trench on its outer flank reveals that the structure is built with limestone crumbles covered by red clayish earth (Figure 8.14). To the north it is interrupted by the modern road, but the observation of the aerial photographs and historical and recent satellite images allows to recognize its original extension, which curved towards the town joining to the eastern rampart near the northeastern urban gate (see Plate 13:2). The satellite images also make possible to identify two ancient tracks starting from the northeastern and southeastern gates and another defensive structure to the south of the tell almost completely destroyed by modern agricultural work, running from east to west for 80 m at a distance of 200 m from the southern rampart.¹⁷

To the east, the area between the fortification and the outer rampart can be divided into an inner higher part ca. 100–150 m wide, with a high density of pottery sherds and stone fragments visible on the surface, and a depression extending as far as the foot of the outer rampart in which sherds are almost completely lacking. A tentative hypothesis, to be checked through geomorphological investigations, is that the depression could have been a moat filled with water flanking the outer rampart. Several carved blocks of basalt and limestone were piled up in modern times at the southern edge of the outer rampart, although it is difficult to ascertain whether they come from the southeastern gate or can be related to a destroyed structure linked to the outer system of fortification. The eastern outer town has been surveyed according to its subdivision into ten sectors of 50 x 50–80 m (A–L), from the southeastern gate to the modern asphalt road to the north (for a length of 500 m), and from the foot of the rampart to the limit

represented by the olive tree grove that borders the depression before the outer rampart to the east. In these irregular sectors all the diagnostic sherds (rims, bases, decorated fragments) and the small finds and stone tools have been collected and recorded. A high density of archaeological materials and the sporadic presence of limestone and basalt stones used as architectural components for foundation or socle proves that the area was homogeneously settled. The area occupied by the grove is also characterized by the presence of pottery sherds, although the material is scattered and less abundant because the agricultural work has strongly altered the original surface, preventing a detailed investigation. The materials collected on the surveyed area to the east show a very high frequency of chronologically homogenous pottery dating from MB I and MB IIA, with few EB IV sherds. No diagnostic sherds of the very end of MB II and later periods have been found. Thus, the occupation of this suburb of the town can be dated unequivocally to the MBA, roughly between the twentieth and the beginning of the seventeenth century B.C. An earlier occupation in this area is also possible but it should be verified through test excavations, since the few EB IVA-B sherds found here could be the result of the natural erosion of the outer slope of the eastern rampart and of post-depositional natural and anthropic processes, such as the intensive agricultural modern work in this area. The lack of MB IIB pottery seems to indicate that the area was abandoned before the final destruction of the Old Syrian town, confirming the hypothesis of a settlement contraction and demographic crisis suggested by Matthiae (1998, 582–84; 2006a) based on architectural evidence from the Lower Town and the fortifications.

The materials also give us important information on the activities that presumably took place in the area. Pottery attests few types of medium-large closed vessels in Simple Ware, mainly craters, jars, and jugs, together with big storage jars; small open shapes are not frequent, and Kitchen Ware is almost completely lacking (Figure 8.15). A large number of different types of basalt instruments have been collected. This high frequency of a diversified range of stone tools contrasts with

the scattered homogeneous presence of grinding slabs and grindstones inside the Lower Town, where it is related to food processing made in the MB houses. On the contrary, in the stone inventory from the eastern outer town, a wide range of tools related to diversified handicraft activities—percussion tools, whetstones, bowls, mortars, and pierced stones—are attested together with grinding stones (Figure 8.16). Moreover, several pottery slags and by-products indicate that pottery manufacture took place in the area, especially around the southeastern city gates (Figure 8.17). In the southern area the frequency of pottery sherds sharply decreases, but stone tools and some slags have been collected.¹⁸ Thus the surface materials seem to indicate a scattered occupation, characterized by handicraft activities. The area comprised between the western limit of the surveyed southern sector and the southwestern city gate is deeply plowed. A field-walking along the plowing furrows allows to retrieve only few MB sherds, and no stone tools or architectural materials have been noticed. It is therefore probable that this area was not settled, whereas the eastern part of the southern outer town had a dispersed occupation with scattered working areas, and that domestic quarters and industrial areas were concentrated in the eastern suburb, possibly in relation with an artificially created water basin.

5.3. Tell Munbatah

In September 2010 a short survey of Tell Munbatah and its surrounding territory has been conducted as a preliminary to the soundings at this site scheduled within the ECP (Figure 8.18). This investigation aimed at recording the state of preservation of the site itself;¹⁹ at verifying and partially documenting the basalt-made structures already observed by de Maigret (1974, 251–53), which still occupy the flat surface of the hill; and at systematically collecting a sample of pottery to complete the portrait of the material culture of the settlement already traced in the 1970s.

The site is a slightly ovoid hill about 220 x 240 m large and no more than 15 m high; the southeastern edge of its upper part seems to

locate a kind of acropolis (Figure 8.19).²⁰ Four asymmetrically located depressions mark the possible emplacement of four city gates that, at least in one case, seem to be partially preserved and still visible (Figure 8.20). The architectural remains of basalt stone buildings, which design a continuous series of small quadrangular rooms, are concentrated along the upper edge of the hill, whereas, in spite of the good state of preservation of the site, nothing seems to rise on the surface of the slightly slope ring at the base of the hill.²¹ Even though the local architecture seems to have been traditionally made of basalt stones, it is difficult to correlate the architectural remains with the pottery collected.²² According to the regional comparisons, the architecture preserved on the surface could rather testify to the latest occupation of the site, whereas the majority of the pottery dates back to the very end of the third millennium B.C.²³ Thus, only the pottery seems to suggest a chronological analysis of the settlement and, at the same time, a verisimilar hypothesis on its function inside the territory controlled by Ebla. As already documented by de Maigret (*ibidem*, 254–55), the pottery from the surface of Tell Munbatah belongs to EB IV (Mardikh IIB) with a strong predominance of EB IVB, which corresponds to Mardikh IIB2 (Hama J4–1) (Figure 8.21). Nevertheless, the 2010 survey calls for a reconsideration of the material from the early survey and a contextual definition of some assumptions for future research. It is significant that also the relative quantities of both types and shapes match the early results and seem to confirm the verisimilar correlation of Munbatah to the west on the one hand and the Euphrates on the other.²⁴ Representative of the assemblage of 2010, more than 50 percent of the sherds collected (almost entirely Simple Ware, with few examples of a different treatment) is storage pottery; a bit less than 30 percent is represented by bowls and goblets; and the rest of the sample collected does not find a proper comparison for fabric, shape, and surface treatment. It seems that these materials could be also dated to EB IV, but the differences cannot be ignored at the moment. It could also be possible that the average indicates features of the local pottery repertoire of either EB IVA or EB IVB that cannot be defined in the

light of the lack of other assemblages from the same area.²⁵ The Simple Ware is almost exclusively documented for small- and medium-size shapes. The Painted Simple Ware is scarcely documented and, indeed, it is exclusive to some of the few sherds of goblets and bowls. If compared to the assemblages from Ebla and the surrounding area, the scarcity of the Painted Simple Ware at Munbatah seems to indicate the prevalence of local features.²⁶ However, in terms of both shape and function, the assemblage of Munbatah seems to be partially different from the assemblages of both central Syria and the region's eastern limit on the Euphrates. Even though a high percentage of goblets could have been expected, as in both Ebla and Tell Tuqan, the percentage of goblet sherds from Tell Munbatah is quite low.²⁷ In a few occasions they are painted in black or brown in the upper part of the body according to a pattern of horizontal bands and lines. Vertical-rim bowls are also attested. Concerning the storage pottery, the majority of the sherds collected testify to a conspicuous use of small- and medium-size jars, tall or short necked, with thickened or beated everted rims. The lack of large jars and pots has to be carefully considered in evaluating the possible function of Tell Munbatah in the regional system of Ebla.

Since it is likely that the occurrence of the mass-produced caliciform pottery corresponds to the area under the control of the Eblaite kingdom, the survival of the settlement at Munbatah in accordance with the historical and archaeological sequences of Ebla suggests that the urban structure of the kingdom itself survived after the Akkadian destruction of Ebla and disappeared only after its definitive collapse at the end of the third millennium B.C. The presence of Ebla in this apparently marginal area set in motion the irreversible process of territorial occupation that seems to be reflected also in some features of Tell Al-Rawda. Even though it is located outside the area of our research, Al-Rawda belongs to the same dry area of central Syria and seems to mark the eastern limits of the sedentary settlement in EB IVB that, according to Geyer, could have been limited by the so-called Very Long Wall (TLM), a symbolic boundary between the

steppes, to the east and by the cultivated lands to the west, and which was under the direct control of an important centre of the EBA, possibly Ebla (Geyer et al. 2004–2005; Geyer et al. 2007; Geyer et al. 2010).

6. A PRELIMINARY ARCHAEOLOGICAL MAP OF THE EBLAITE *CHORA*

The information available through topographical maps, satellite imagery, and preliminary fieldwork allowed a first inventory of the archaeological sites located in the area investigated by the ECP (Table 8.4).

This inventory (Plate 14), still in progress, must be considered the first step of a long-term project aimed at a comprehensive recognition of the archaeological features of the territory of Ebla. Future ground controls will validate these results and will change the number and type of the records collected.

The inventory of the Known Sites includes eighty-five sites: sixty-four tells and twenty-one ruins of Classical settlements (see Table 8.4). Among the tells, forty-six were visited in the past by the scholars surveying the region, whereas fifteen have been located by ECP using the topographical datasets available. Shape and extension can be roughly evaluated through CORONA and Google™ Earth Pro satellite imagery, whilst data related to height and chronology cannot be fully available without a ground control. Therefore, only some very preliminary considerations can be made on the settlement pattern of the Eblaite *chora* (cf. § 7), and further specific analyses will be needed after the collection of new data on the field.

The ruins recorded among the Known Sites are only those visited by Pericoli Ridolfini (1965). Otherwise, the ruins reported on the French maps on a 1:50,000 scale are difficult to recognize on satellite imagery because they overlap with the houses pattern of the rural villages.

The Potential Sites refer to seventy features identified on the topographical maps and/or satellite imagery (Table 8.5). This category

includes five major types of sites: tells, ruins, off-sites, canals, and kites (Table 8.6). Most of them are either tells reported on the maps but not available on the recent satellite imagery like Google™ Earth or toponyms referring to “tells” but neither detected on the satellite imagery nor mapped on the topographical maps. The identification of likely off-sites, traces of canals, and kites is related to an analysis of CORONA satellite imagery rather than topographical maps; therefore it will be described separately (see Galiatsatos and Mantellini, in this volume).

7. SITES DISTRIBUTION

Based on the finds collected during the early surveys and the geographical location of the archaeological sites, some considerations can be advanced regarding the settlement pattern of the region of Ebla, with a special regard to the EBA (Table 8.7).

These preliminary reflections take into account a few important aspects. First, the chronology is based on early surveys of the region that have been partially updated and refined thanks to the recent stratigraphical excavation at some key sites like Tell Mardikh/Ebla, Tell Tuqan, Tell Afis, Tell Mastuma, and also Tell Deinit, though the latter is placed outside of the ECP area of investigation. Second, only the Known Sites have been included in the analysis and not the Potential Sites, which require a ground control (cf. § 6). Finally, the attention is mainly focused on the EBA period and therefore on the pre-Classical tells (Plate 15). All the sites belonging to later periods, such as the Hellenistic, Roman, and Byzantine periods were not considered in this analysis.

7.1. Sites in the Limestone and in the Basalt Areas (Area A)

The sites recorded in the limestone and in the basalt hills around Tell Mardikh (Area A) are actually forty-five. Although twenty-one sites of the Classical period recorded by Pericoli Ridolfini are not taken into account in this preliminary evaluation,²⁸ it is however worth noting that they are mostly located to the south of Ebla

and at the foothill of the Jebel Zawiyeh, where there is abundance of local stones to be used as construction material.

Among the twenty-four pre-Classical sites, typically tells, fifteen are located in the limestone and nine in the basalt hills (see [Table 8.7](#)). The tells are distributed at different altitudes (Plate 16:1). Only one of them (Tell Zafar, EC 025) is between 250 m and 300 m a.s.l. in the basalt zone, and only one of them (Tell Zaytun, EC 017) is at an altitude higher than 550 m a.s.l. (see [Table 8.8](#), Plate 16:1).

Exactly half of the tells are located between 350 and 450 m a.s.l. Five sites in the basalt and one in the limestone are between 350 and 400 m a.s.l.; conversely, five sites in the limestone (including Tell Mardikh/Ebla) and one in the basalt are between 400 and 450 m a.s.l.

As pointed above, the lack of sites above 550 m a.s.l. suggests that the “lines of wells” identified by Poiderbard (1934, 22–23) can be traced around 500 m a.s.l. Beyond this limit, the digging of wells might have been impossible because of the depth of the water table, and therefore water could only be supplied through another hydraulic solution such as the cistern (de Maigret 1981, 16). The basalt hills to the south do not reach the altitude of the Jebel Zawiyeh, and most of the sites are located between 350 and 400 m a.s.l. At this height, the cultivation of olive trees, vineyards, and orchards is possible and fruitful (de Maigret 1978, 84).

Chronological attribution to the EBA is possible for ten sites of Area A (see [Table 8.7](#)): seven in the limestone, including Tell Mardikh, and three in the basalt.

Pottery of the EB IVA only (de Maigret Phase II: *ibidem*, 87–89) has thus far been found only at one site: Tell Mahti (EC 007), in the basaltic sector. Pottery of the EB IVB alone (de Maigret Phase III: *ibidem*, 89–90) was indeed recovered in four sites: Tell Aghar (EC 006) and Tell Abyad (EC 010) in the limestone sector; Tell Ghadfa (EC 022), Tell Kursiyan (EC 008) in the basalt sector. Five sites, all of them located in the

limestone area, show a continuous occupation between EB IVA and EB IVB: Tell Mardikh/Ebla (EC 001), Tell Sheikh Mansur (EC 005), Tell Dadikh (EC 011), Tell es-Sfine (EC 013), and Tell Mastuma (EC 096). The latter was the object of a long-term systematic excavation program by the Syro-Japanese expedition (Iwasaki et al. 2009).

Finally, the altitude of the EBA sites reflects the general trend described above for Area A, because most of the tells were equally distributed between 300 and 400 m a.s.l.: three between 300 and 350 m a.s.l. and three between 350 and 400 m a.s.l. According to de Maigret (1978, 88), the presence of EB IVA sites outside the Matkh is evidence of the settlements expansion even in the less fertile parts of the region that occurred in the middle of the third millennium B.C.

The major settlement of this subregion is of course Tell Mardikh/Ebla (Plate 16:2, [Figure 8.22](#)), which has revealed a long sequence of occupations during the EBA, reaching an extension of approximately 60 ha during the EB IVA (Matthiae 1989a; 2008a; 2010b; see also Matthiae, in this volume).

7.2. Sites around the Matkh (Area B)

Area B of the ECP survey, corresponding to the Matkh depression, was archaeologically unexplored since the beginning of the Italian Archaeological Expedition in Syria, which started the digging at Tell Mardikh in 1964. During the first campaign, several tells around Ebla were visited by Liverani, including Tell Tuqan, located at the southwestern margin of the ancient lake.²⁹ Tell Tuqan was the only settlement of the Matkh region included in the brief report of the 1964 survey, which contained a general topographic description (outer fortifications, urban city gates, Upper and Lower town) and a chronological evaluation of the pottery collected on the surface. Two major periods of occupation were detected, EB IVB and MB I, and a later Hellenistic and Roman settlement on the Upper Town was also recognized. The site has been also included in the survey carried out by the Italian Expedition at

Tell Afis in 1985–1986 (quadrant southeast, site no. 14; Ciafardoni 1992, 42–43, fig. 4:2), even though the expedition did not collect surface materials, since three campaigns of soundings had already been conducted by MAIS under the direction of Matthiae—in 1978, 1981, and 1986 (see Baffi and Peyronel, in this volume).³⁰

A systematic survey of the pre-Classical sites in the Matkh region was carried out in three short campaigns in 1971, 1972, and 1974 by MAIS, under the responsibility of de Maigret (1978; see also 1981), who identified nine sites around the Matkh depression (sites nos. 31–39), five sites immediately to the west of the lake (nos. 24–26, 29–30), four sites located near the lake in a hilly territory to the east of the central-southern part of the basin (Hadidines hills: nos. 49–52), and nine sites clustered between the lake and the northwestern slope of Jebel el-Hass (nos. 40–48).

All the sites in the Matkh and in the Hadidines hills are included within the limits of ECP survey area B, together with four sites immediately west of the lake (nos. 25–26, 29–30) and six settlements located between the Matkh and the Jebel el-Hass foothills (nos. 40–42, 46–48), strictly related to the Matkh settlement system. The chronological periodization adopted by de Maigret distinguished between three EBA phases (cf. § 4.3): Phase I, dated to LC and EB I–III; Phase II, dated to EB IVA; and Phase III, dated to EB IVB.

Nine sites of Phase I, which at the time were detected on the basis of few pottery types, without a clear subdivision of EB I–III (Late Chalcolithic Chaff-Faced Ware, Amuq Phases F–G–H, and Hama K pottery classes), are all located in the Matkh depression.³¹

In a decreasing order by presumed size, according to de Maigret (*ibidem*, fig. 10) the sites of ECP survey Area B containing materials dating from LC to EB III are the following: Tell Waaz (no. 35, EC 037), Tell Baraghitah (no. 30, EC 014), Tell Abu Mreir (no. 51, EC 108), Tell Atchana (no. 39, EC 032), Tell Sultan (no. 32, EC 029), Tell Ras el-Ain (no. 033, EC 026), Tell Allush (no.

37, EC 033), Tell Debben (or Tell Akereb, no. 36, EC 041), and Tell Abu el-Mujaher (or Tell Abu Mughahar, no. 49, EC 038).

All the mounds are located at a short distance from the limits of the shallow marsh area, around its irregular shoreline, without any apparent cluster. They seem to be characterized by common features, such as their scattered location, their small dimensions, the more or less regular circular shape, and the low height of the tells. In most cases they also show a continuity of occupation during the following EB IVA phase and, although it is difficult to ascertain if their size was the same during all the EBA phases, the dispersion of EB I–III sherds on the surface seems to indicate that the first occupation roughly corresponds to that of the EB IVA–B periods. The sizes of these mounds range between 0.3 and 4 ha.³² According to de Maigret, the settlement system of the Matkh region during the late fourth millennium B.C. and the first half of the third millennium B.C. was characterized by small sites clustered around the margin of the ancient lake, which were isolated from the neighboring regions and exploited the favorable environment and the agricultural and husbandry potential of the territory (*ibidem*, 86–87, fig. 10).

Settlement of Phase II (EB IVA) were mainly identified according to the presence of corrugated goblets sherds and other diagnostic types related to the “caliciform” culture and widely diffused in the assemblage of Royal Palace G and Building P4 at Ebla (*ibidem*, 87–89, fig. 11; see Mazzoni, and Marchetti, in this volume).

Out of nine sites occupied during Phase I, along with Tell Tuqan, seven continued to be settled during Phase II:³³ Tell Baraghitah (no. 30, EC 014), Tell Abu Mreir (no. 51, EC 018), Tell Atchana (no. 39, EC 032), Tell Ras el-Ain (no. 33, EC 026), Tell Allush (no. 37, EC 033), Tell Debben (or Tell Akereb, no. 36, EC 041), and Tell Abu el-Mugiahah (or Tell Abu Mughahar, no. 49, EC 038). Ten sites seem to have been settled for the first time during EB IVA: Tell Hader (or Tell al-Hadir, no. 42, EC 036), Tell Fakhar (or Tell Fakhar, no. 34, EC 027), Tell Sheikh Fares (or Tell Shih Faris, no. 29, EC 016), Tell Bajer

(EC 095), Tell Abu Rwai (no. 47, EC 034), Tell el-Aweinat (no. 48, EC 043), Tell Kalbe (no. 31, EC 028), Tell Hubar (no. 46, EC 035), Tell Selmo (or Tell Selmo, no. 52, EC 024), and Tell Gilash (or Tell Glas no. 25, EC 045).

Thus, twenty-two sites have given materials dating to EB IVA, suggesting that the Matkh was densely settled during the Mature Early Syrian period, at the time of the apogee of the Eblaite kingdom.³⁴ De Maigret underlined, on the one hand, the continuity in occupation of most of Phase I settlements and, on the other hand, the presence of several new sites in the area, indicating a demographic increasing and possibly the development of a hierarchical settlement system during EB IVA. It is also interesting to observe the appearance of five EB IVA sites in the piedmont of Jebel el-Hass, with an occupation of the eastern steppe probably linked with an intensive exploiting of husbandry.³⁵ However, the size and shape of Phase II sites are difficult to ascertain since most of them have a superimposed MB occupation. In this respect the most important site, Tell Hader (EC 036), ca. 16 ha large, lying at a short distance from the east bank of Nahr el-Quweiq was probably founded in this period to control the access to the marshland from the north, but it is difficult to know if the size of the mound corresponds to the first occupation dated to EB IVA.

Phase III, corresponding to EB IVB, and identified by the presence of Painted Simple Ware and other diagnostic types such as bowls with vertical grooved or double rims, is marked by a reduction in the number of sites inside the Matkh area, and, at the same time, by a new occupation of the arid margins as far as the southeastern Kharaitsh *sebkhas*, including some fortified sites controlling the routes giving access to the Jabbul Lake (Tell Munbatah and Tell Sabkha) (de Maigret 1974; 1978, 89–90, fig. 12; § 5.3).

EB IVB materials have been collected in twelve sites, nine of which were already occupied during Phase I or II: Tell Tuqan (EC 002), Tell Hader (or Tell al-Hadir, no. 42, EC 036), Tell Fakhar (or Tell Fakhar, no. 34, EC 027), Tell Allush (no. 37, EC 033), Tell Sheikh Fares (or Tell Shih Faris, no.

29, EC 016), Tell Bajer (EC 095), Tell Abu Rwai (no. 47, EC 034), Tell Hubar (no. 46, EC 035), and Tell Kalbe (no. 31, EC 028).

The most striking phenomenon seems to be the abandonment of settlements already occupied in Phase I–II, with the only exception of Tell Tuqan (EC 002) and Tell Allush (no. 37; EC 033). On the contrary, the sites apparently founded in Phase II (EB IVA) continued to be occupied, except Tell Selmo (no. 52, EC 024), Glass (no. 25, EC 045) and Tell el-Aweinat (no. 48, EC 043) are seemingly the only sites not occupied before EB IVB Phase III.

De Maigret does not report the importance of Tell Tuqan (EC 002) during this period, and strangely this site is not included in the list of Phase III, although Liverani had already noticed the widespread presence of painted EB IVB pottery all over the tell. After the archaeological excavations at the site it was ascertained that during the last three centuries of the third millennium BC Tuqan was a large town, probably reaching the actual size of the mound, which is more than 25 ha. EB IVB architectural levels were identified below the MBA city Gate A, on the inner slope of the outer rampart and at the centre of the Lower Town (see Baffi and Peyronel, in this volume). According to these excavation data, Tuqan should be considered the central place of the Matkh EB IVB settlement system. At the northern limit of the region, other large sites are Tell el-Is and Tell Hader (both ca. 16 ha), and between these two major centres, several villages (from 1 to 4 ha in size) were located around the ancient lake shorelines.

The period spanning LC to EB III is well represented in the Matkh, with small settlements placed around the lake to exploit its natural resources. Data from the survey do not allow a better chronological distinction, and it is not possible to specify if there was an increment of settlements during EB III, when a process of urban sociodevelopment started in northern inner Syria. However, sites exceeding 4 ha seem to appear only in the second half of the third millennium B.C. and at least one large town of more than 25 ha is present during EB IVB, Tell

Tuqan (EC 002). The peak of the occupation was reached during EB IVA, when eighteen sites are attested, although materials collected on the surface suggest that the larger mounds (Tell Hader and Tell Tuqan) were not completely occupied during this period. During EB IVB the abandonment of some sites in the area corresponds to a more pronounced hierarchical structure of the settlement system, and it is very probable that Tell Tuqan reached its maximum extension at that time, representing the largest site of the region and becoming an important town of northern inner Syria after the destruction of Ebla at the end of EB IVA.

7.3. Sites at the Margins of the Steppe

Although the largest of the ECP survey area, Area C registers a low number of sites. Apparently, this depends on their chronological definition.³⁶ Among those sites, five can be surely dated to EB IV, according to the previous evaluation of de Maigret (1974): Tell Munbatah (EC 003), Tell Mase (or Tell Ghazel, no. 50, ECP 039), Tell Bridah (or Tell Berdeh, no. 45, EC 042), Tell Hamidiyeh (no. 44, EC 058), and Tell Sabkha (EC 044). Tell Tat (ECP 099) and Tell Anbara (EC 051) could be EBA settlement according to Haase (1983, 74), though their interpretation was based on too generic factors like shape and size. The majority of them have a circular shape; other shapes or irregular layouts may be the results of one or more events occurred to the settlements themselves (reoccupation in ancient times, damages caused by natural events, damages caused by modern human activities, etc.). Nevertheless, since the sites in question have not been visited during the ECP survey, any correlation between the uncommon shape of one site and a particular event remains hypothetical. The largest sites of the area are Tell Munbatah (5.7 ha) and Tell Anbara (4.5 ha).³⁷ At the northern edge of the Jebel Hass, the location of Tell Anbara seems to suggest that no huge settlements, and possibly no settlements of the EBA period, were located in the upper part of the mountain.

Located at the passage between the Jabbul plain to the northeast and the salt marshland of the

Kharaitsh to the south/southwest, and more extensively at the northern edges of central dry Syria, Tell Munbatah is the core site of the region according to the comparative dimensional scale of the tells. Besides any considerations about the landscape and its potential,³⁸ which clearly pose it in a prominent position, Tell Munbatah could be considered the guiding site of a verisimilar regional settlement system, also thanks to its restricted but unique and quite defined archaeological documentation.

Notwithstanding the lack of a proper archaeological documentation, both Tell Munbatah and Tell Sabkha, according to their morphology, could document an early considerable occupation that can only be dated to EB IVA, when Ebla shaped the path of its territorial control according to the functioning of its system. The comparison with the pottery of Tell Sabkha, already documented by de Maigret (1974, 264), suggests that both settlements could have had different roles in the Eblaite *chora*. There is no doubt that both sites have been long occupied, even though it would be difficult to ascribe either a pastoral or an agricultural nature to them. However, the pottery from Tell Sabkha is chronologically less consistent and reflects an occupation that could have been based on collateral factors, not necessary linked to the political and administrative agency of Ebla or to a pre-existent productive potentiality of the settlement itself, as is clearly the case for Munbatah. It is not clear yet if the presence of the steppes and their faunistic resources could have affected the settlement process in both EB IVA and EB IVB. According to studies of different areas, the steppes were exploited mostly in the MBA (Schwartz et al. 2000, 435). However, in the light of the previous considerations on the pottery from Tell Munbatah, it is significant that the corridor of Khanaser, where Munbatah is located, was the only way to move from the area of Emar to the cities of the central plains, and Ebla in particular. Thus, Tell Munbatah and Tell Sabkha seem to mark the road that, south of Jebel Hass, linked the diverse parts of the kingdom. De Maigret (1974, 266; 1978, 90) considered these centres as the fortresses in charge

of controlling the connecting road between different territorial domains. Besides the doubts concerning the chronological interpretation of the defensive structures identified on the top of both hills, which at the moment cannot be positively attributed to EB IV, there is no reason to consider the two sites as two settlements of the proper Ebla *chora*. Indeed, this territorial organization could have been based on the non-occasional sedentariness of the populations of central Syria, which can be fully integrated into a first and well-organized state framework.

Thus, the location of Tell Munbatah marks a crossroad and signals more than one direction the core of the region of Ebla could be opened to and from. The first connecting path is the intraregional one that, from northwest to southeast, crosses the three ecological zones and could lead to the steppes; the second one, crescent-shaped, crosses Tell Munbatah and turns northeast towards the Jabbul plains and then the Euphrates. The most recent record of the use of the territory immediately before the national reforms of 1958 (Wessels and Hoogeven 2002, 4) attributes the use of the land around Munbatah almost exclusively to grazing or hunting until the most recent implementation of both rain-fed and irrigated fields. It is therefore probable that, except from some relatively larger sites as Tell Munbatah, which can be considered the product of a mature urban and territorial system of control, a general condition of semi-nomadic settlements was characteristic of the antiquity. This is also confirmed by a comparison with some modern villages of the area where, until recently, the populations used to move seasonally with their sheeps to the northern regions of the Aleppo uplands where the rainfall is higher (ibidem 2002, 5).

8. CONCLUSIONS

Although Tell Mardikh/Ebla can be included among those parts of the developing world for which access to topographical maps on a scale more detailed than 1:50,000 and to aerial photos is quite problematic (Donoghue et al. 2002, 216), a preliminary archaeological assessment of

the region is possible however, this assessment is mostly based on a combination of different spatial datasets with the information available from the early surveys carried out in the area of investigation in the past decades. In particular, Menze and Ur (2012) have recently proved the possibility to investigate the archaeological landscape only by means of remote sensing data. This can be done when various reasons make the fieldwork impossible, also because the spatial datasets for this purpose are available today at a very low cost, when not for free. In that perspective, the high-resolution CORONA photographs can be successfully integrated with the most recent satellite images, especially those provided by Google™ Earth Pro, in order to evaluate the landscape transformations occurred over the last decades in the territory surrounding Tell Mardikh/Ebla. The topographical maps of both the French and the Soviet series also proved useful for a preliminary location of the archaeological tells, later confirmed by the satellite imagery. With regard to the city of Ebla and its territory, this analysis will eventually be enhanced thanks to the information provided by the texts from the Royal Archives and the availability of new spatial datasets. Moreover, the long-term excavation activities conducted in some sites of the region also allowed to refine the chronology of the pottery collected on the field.

One of the major aspects characterizing the distribution of the sites is their relationship with the water supply.³⁹ The earliest occupation (Chalcolithic and EB I-III) is attested around the Matkh depression (de Maigret 1978, 86–87), which afforded suitable conditions for the agricultural exploitation of the area. Only during EB IVA the settlements began to appear in the limestone and basalt hills to the west, and in the steppe and the hills to the east. In these areas the water was supplied by wells, and by cisterns at higher altitudes. In spite of its semiarid climate, in the third millennium B.C. the territory of Ebla is characterized by the presence of a great amount of water (de Maigret 1984, 232). However, this was not enough to supply agricultural irrigation over a large scale (Archi 1990b, 15; Matthiae 1998, 78). As de Maigret correctly argued (1981,

3), whilst the great “hydraulic civilization” theorized by Wittfogel (1957) appeared in many parts of the Old World, the wealth of Ebla was not based on the creation of huge hydraulic and irrigation systems. The remote sensing analyses seem to support this theory because no traces of large irrigation canals and hydraulic works have been found on this territory up to this time (see Galiatsatos and Mantellini, in this volume). If on the one hand the hydrological features of this area made possible only dry-farming practices, on the other hand the presence of different environmental regions over a relatively short topographical distance supported the development of an integrated economy at the basis of the Eblaite state (de Maigret 1981, 30).

This approach is of course preliminary, since it cannot replace the fundamental information provided by the collection of pottery, architectural observations, identification of exposed sections, etc., which can only be recorded on the field and which allow a chronological attribution of the sites. The partial investigation carried out in 2010 in the outer rampart of Tell Mardikh and in the site of Tell Munbatah confirmed the need for new archaeological investigations in this area. A comprehensive research agenda remains therefore a fundamental task of the ECP in order to improve the inventory of the sites with new ground detections, off-sites, and anthropogenic features. Ground control is a task that in fact needs to be accomplished, with particular reference to the Potential Sites recorded remotely, in order to reach a comprehensive overview of the settlement patterns of the Eblaite *chora*.

NOTES

- 1 Mantellini has written §§ 2.1, 3, 4.1, 4.2, 4.5, 5.1, 6, 7.1; Micale §§ 2.3, 4.4, 5.3, 7.3; Peyronel §§ 2.2, 4.3, 5.2, 7.2. Introduction and conclusions have been written jointly.
- 2 In Semitic, Ebla possibly means “white (rock)” (Matthiae 2008a, 34). It may also be noted that today the local people often use the toponym Tell Abyad, referring to a “white hill.”
- 3 The river Quweiq (probably the ancient Chalos and/or Belus: see Balty 1982) is ca. 135 km long and it crosses northern inner Syria from north to south, arising from the Gaziantep plateau in southeastern Turkey and flowing through Aleppo to debouch into the Matkh depression (Dorrell 1981).
- 4 For an overview on the geology of the Aleppo basin, and in particular of the Matkh area, see de Maigret (1981, 9–18).
- 5 For the hypothesis about the possible exploitation of salt in other Syrian regions in the antiquity, based on a comparison with similar modern activities, see Akkermans and Schwartz 2003, 124–25. However, the exploitation of salt in the Jabbul in the antiquity remains doubtful (Schwartz et al. 2000, 437; Geyer et al. 2007, 275).
- 6 The impossibility of exploiting the subterranean waters was already pointed out by de Maigret (1978, 85) with regard to the sites identified to the northwest of Jebel el-Hass.
- 7 For EB IV sites registered in the area of Jebel ‘Ala (outside the ECP area) and their system of water collection, see Geyer 2009, 37–39. On the risks of dry farming due to the annual shift in precipitation, see Marfoe 1979, 5.
- 8 The *fayda* is a natural depression collecting the run-off water from the surrounding region (see more details in Geyer and Calvet 2001, 57n3). The most clamant case of settlement on a *fayda* in EB IV is Tell Al-Rawda. Even if the settlement lies in the arid zone, the *fayda* represents one of the conditions favorable to agriculture (Castel 2007, 290).
- 9 In the region of Samarkand (Uzbekistan), the use of the Soviet maps combined with the analyses of satellite imagery and the ground visits were very useful in demonstrating that the land reforms promoted by the Soviet power in the 1960s and 1970s caused the destruction of almost 40 percent of the whole archaeological heritage of this region (Berdimuradov et al. 2007, 27). Moreover, this method allowed the reconstruction of the ancient irrigation systems of the area of Samarkand (Stride, Rondelli, and Mantellini 2009; Mantellini, Rondelli, and Stride 2011; Rondelli, Stride, and García-Granero in press).
- 10 The free service provided by www.poheali.org was replaced at the end of 2011 by www.mapstor.com.
- 11 See more on the Landsat imagery in Tucker, Grant, and Dykstra (2004).

- 12 For a general overview of the application of CORONA satellite imagery for archaeological purposes see Galiatsatos (2004) and Parcak (2009).
- 13 The EB IV site of Tell Munbatah, 5 km southeast of Khanaser, was also visited during the survey and described in a specific study (de Maigret 1974; cf. § 5.3).
- 14 A selection of pottery fragments from few sites has been published to illustrate the main diagnostic types of each chronological period: de Maigret 1978, figs. 3–9; cf. also de Maigret 1974, fig. 16, nos. 1–18 (Tell Sabkha). A quantitative analysis of pottery sherds from Tell Munbatah is also published, with a more detailed discussion on classes and types (*ibidem*, 254–263, figs. 3–15, nos. 1–187).
- 15 Geyer (see Geyer et al. 2004–2005, 23; Geyer et al. 2007, 275) denies any presence of Chalcolithic pottery.
- 16 The survey and the analysis of the materials collected have been carried out by Luca Peyronel in collaboration with Marta D’Andrea and Sara Pizzimenti.
- 17 The area delimited by the eastern outer rampart and its southern extension is approximately 30 ha.
- 18 The survey in the southern area has been carried out according to a general subdivision into radial transects of ca. 50 x 200/220 m (for a length east–west of ca. 460 m), starting from the foot of the rampart to the higher-elevation area, which might be what is still preserved of the outer defensive rampart.
- 19 The recent investigation confirmed the lack of illegal excavations, as already noted in the 1970s by de Maigret (1974, 253).
- 20 For a description of the morphology of the site and its architectural remains after its first identification, see de Maigret (*ibidem*, 251–53).
- 21 See the round-shaped structures that de Maigret observed and considered the bases of two semicircular towers (*ibidem*, 253). In 2010 they were not visible anymore.
- 22 The building technique based on the use of the local basalt is generally related to the Roman-Byzantine architecture in the whole area. Indeed, the use of basalt stones for the basements, as well as mud bricks for the elevations and the roofing of domestic units, has been documented and considered peculiar of the region of Khanaser (Rivoal 2010, 81), contrary to the exclusive use of stones, for both basements and elevations, in the other settlements of the same centuries.
- 23 See the different hypothesis by de Maigret (1974, 263), which attributes the basalt structures recognized on the surface to EB IVB.
- 24 The likely function of Munbatah as a link between the “caliciform” cultures of the West and the Euphrates has been strongly emphasized by de Maigret himself (1974, 264–66), who underlines that the site managed the contacts and the exchanges between centres that shared the same culture, as their pottery seems to confirm.
- 25 The impact of regional variability in considering the different assemblages and their chronological definition, according to the evidence of Mardikh IIB1-2, has already been stressed by Mazzoni (1985a, 9).
- 26 For a general overview of EB IVB pottery from Ebla and, most recently, Tell Tuqan (in particular Area P), see Matthiae (2000, 580; 2006a, 92–94; 2006b, 470–75; 2007, 507–12; 2009, 755–58; Peyronel 2008, 36–37; 2011, 89–90). See also the pottery assemblage from Emar (Finkbeiner 2007, 227–33).
- 27 In the Middle Euphrates assemblage from Tell Selenkahiye (late phase) the bowls and goblets are less represented than pots and jars, but in grave contexts they all seem to be equally represented (Schwartz 2001, 225, 254–61).
- 28 According to the descriptions by Liverani (1965, 116) and Pericoli Ridolfini (1965, 142), the ruins spread across the village of Tell Debes refer to a Classical, rather than a pre-Classical settlement.
- 29 Site no. 4 in Liverani (1965, 112–14). The site had already been noticed by Albright during his journeys in Syria in 1925 (Albright and Dougherty 1926, 9) and in 1932 (Albright 1933, 31), and it attests to an important occupation dating to the Bronze Age, between the end of the third and the beginning of the second millennium B.C.
- 30 The site of Tell Hader (EC 036) was also visited during the Tell Afis survey (Ciafardini 1992, 40–41, site no. 9), although the materials collected have been dated exclusively to the MB period.
- 31 The recent excavations in Area P at Tell Tuqan (EC 002) revealed that also this site was already occupied during EB III (see Baffi and Peyronel, in this volume). It must be noted that in de Maigret (1981, fig. 7), Tell Sultan (EC 029) and Tell Waaz (EC 037) are strangely absent, although they have yielded materials dating to LC-EB I-III, as shown in de Maigret (1978, fig. 10). Interestingly, the site of Tell Tabbarah, which appears

on the map of Phase I, is not reported in the general map of the surveyed area that identifies the fifty-four sites (ibidem, fig. 2), nor in another map of third millennium settlements (de Maigret 1981, fig. 7). The site was located by de Maigret within the western part of the marshland and it is likely identified on the CORONA satellite imagery as PS 13 (see Galiatsatos and Mantellini, in this volume).

- 32 The largest mound, Tell Waaz (EC 037), reached its maximum size during the MB I-II (Phase IV); therefore, during Phase I the site was probably smaller.
- 33 EB IVA materials were not retrieved on the surface at Tell Sultan (EC 029) and Tell Waaz (EC 037); however, the first was certainly occupied during EB IVB (Phase III) and the latter was reoccupied during the MBA (Phase IV), apparently after a long gap corresponding to EB IVA-B.
- 34 The excavations at Tell Tuqan yielded few materials from later secondary contexts that can be assigned to EB IVA (see Baffi and Peyronel, in this volume).
- 35 De Maigret (1978, sites nos. 44 [EC 058], 47 [EC 034], 45 [EC 042], 46 [EC 035], 48 [EC 043]). The

extension of these sites ranges between ca. 0.9 and 4 ha.

- 36 According to Rivoal (2011, 145, fig. 2), also the Roman-Byzantine settlements are only few units if compared to those of the same period on the Jebel Shbeyt, but in the map of Haase (1983, 73) both mountains look equally settled. However, that could depend on the fact that Haase seems not to have made a clear chronological distinction between the sites he registered. Thus, Byzantine and Bronze Age settlements are indicated on the same map without any evident differentiation.
- 37 Tell Sabkha is only 1.5 ha large, whilst the others do not exceed 1 ha.
- 38 Geyer has recently divided the region in several sectors whose productive and settling potentials are based, among other factors, on the soil deposits and their potential of water retention. The Khanaser corridor corresponds to Geyer's most favorable class (Geyer et al. 2004–2005, 21; Geyer 2011, 14).
- 39 For a detailed analysis of this matter see de Maigret (1981).

SERIES	SCALE	AREA
FRENCH	1:50,000	Idlib
		Jarjanaz
		Maarrat en-Numan
		Saraqeb
SOVIET	1:100,000	Idlib
		Abu ed-Duhur
		Fajdan
		Haffa
		Maarrat an-Numan
		Kanat es-Savarne
	1:200,000	Idlib
	1:500,000	Abu ed-Duhur
		Aleppo
SYRIAN	1:50,000	Tell Rifaat
		Idlib
		Abu ed-Duhur
		Maarrat en-Numaan

Table 8.1. Maps coverage available for the territory of Tell Mardikh/Ebla within the ECP.

LIVERANI ID	ECP ID	SITE Name	DE MAIGRET ID
Liv-01	EC 001	Tell Mardikh	deM-18
Liv-02	EC 002	Tell Afis	deM-21
Liv-03	EC 005	Tell Sheikh Mansur	deM-23
Liv-04	EC 002	Tell Tuqan	deM-26
Liv-05	EC 011	Tell Dadikh	deM-19
Liv-06	EC 010	Tell Abyad	deM-17
Liv-07	EC 006	Tell Aghar	deM-27
Liv-08	EC 009	Tell Khatri	deM-28
Liv-09	EC 047	Tell Debes	n/s
Liv-10	EC 007	Tell Mahiti	deM-13
Liv-11	EC 008	Tell Kursiyan	deM-12

Table 8.2. Sites surveyed by Liverani in 1964.

PHASE	PERIOD	BASALTIC HILLS	JEBEL ZAWIYEH	WEST OF MATKH	MATKH	HADIDINES HILLS	STEPPE	KARAYTCH	TOTAL
I	LC-EB I-III	-	-	1	6	2	-	-	9
II	EB IVA	5	3	5	6	4	6		29
III	EB IVB	1	4	5	5	1	4	2	22
IV	MB	12	9	8	6	3	8	-	46
V	LB	1	3	3	1	-	1	-	9
VI	IA	9	7	3	1	-	-	-	20
VII	Persian	-	3	2	4	-	6	-	15

Table 8.3. Classification of the sites surveyed by de Maigret (1978) according to ecological zoning.

	CORONA	FFL 1:50,000	SOVIET 1:100,000	SOVIET 1:200,000	SOVIET 1:500,000
A	0	10	44	51	75
B	78	37	38	30	10
C	7	36	0	0	0
D	0	2	3	4	0
Total	85	85	85	85	85

Table 8.4. Detection of archaeological sites according to CORONA satellite imagery and topographical datasets (A = sites not available in the dataset; B = sites available in the dataset; C = sites in area not covered by the dataset; D = sites represented with an unusual symbol).

No.	DATASET
FFL 1:50,000	39
Soviet 1:100,000	24
Soviet 1:200,000	13
CORONA	23
WorldView-2	4
Google™ Earth	4

Table 8.5. Classification of the potential sites according to the datasets used in the identification.

TYPE	No.
Tells	35
Ruins	22
Off-sites	7
Canals	3
Kites	3
TOTAL	70

Table 8.6. Classification of the potential sites according to the supposed typologies.

ECP AREA	SITES	EBA SITES	EB IV SITES	EB IVA SITES	EB IVB SITES
A - LIMESTONE	15 (24)	7	7	5	7
A - BASALT	9 (21)	3	3	1	2
B - MATKH	27	22	21	18	12
C- STEPPE	13	5	5	4	3
TOTAL	64 (85)	37	36	28	24

Table 8.7. Classification of the EBA, and specifically of the EB IV sites, according to ecological subregions. The numbers between brackets in the limestone and basalt areas refer to the total number of sites including the ruins of the Classical period.

ALTITUDE (m. a.s.l.)	LIMESTONE	BASALT	MATKH	STEPPE AND HILLS	TOTAL
200–250	-	-	14	-	14
250–300	-	1 (1)	17	2	20
300–350	3 (3)	1 (1)	-	2	6
350–400	1 (4)	5 (8)	-	1	7
400–450	5 (8)	1 (6)	-	1	7
450–500	4 (7)	1 (5)	-	-	5
500–550	1 (1)	-	-	1	2
550–600	1 (1)	-	-	2	3
TOTAL	15 (24)	9 (21)	31	9	64

Table 8.8. Distribution of the pre-Classical tells according to elevation. The numbers between brackets in the limestone and basalt areas refer to the total number of sites including the ruins of the Classical period.



Figure 8.1. Basalt rocks and sheep herding around Kanaies (photo September 2010).



Figure 8.2. Basalt landscape from the top of Tell Kursyyan looking southward (photo September 2010).



Figure 8.3. Limestone landscape and cultivation between Tell Mardikh and Luf (photo September 2010).



Figure 8.4. The Matkh depression with the site of Tell Tuqan in the background (photo September 2010).



Figure 8.5. Tell Sultan (EC 026) (photo September 2010).



Figure 8.6. Tell Kalbe (EC 028) (photo September 2010).



Figure 8.7. Flocks watering in the Matkh (photo September 2010).



Figure 8.8. Steppe around Tell Ramla (photo September 2010).

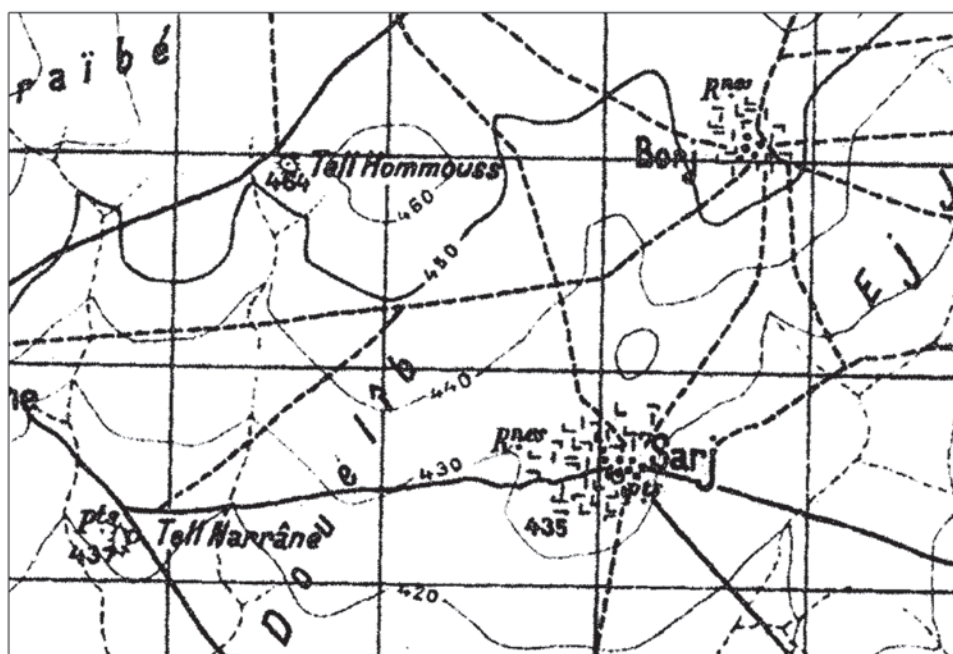


Figure 8.9. Sites identification using French topographical map at 1:50,000 scale: tells and ruins.



Figure 8.10. Sites identification using Syrian topographical map at 1:50,000 scale: the examples of Tell Zaytun (EC 017) and Tell Qalaa (EC 048).



Figure 8.11. Different examples of site identification using Soviet topographical maps at 1:100,000 scale: [1] Toponym only (tell); [2] Double toponym (tell and g.) and symbol; [3] Place name only (khirbet) of the ruins of a Classical settlement; [4] Double toponym (tell and bug) indicating an anthropic mound; [5] Symbol only without toponym.

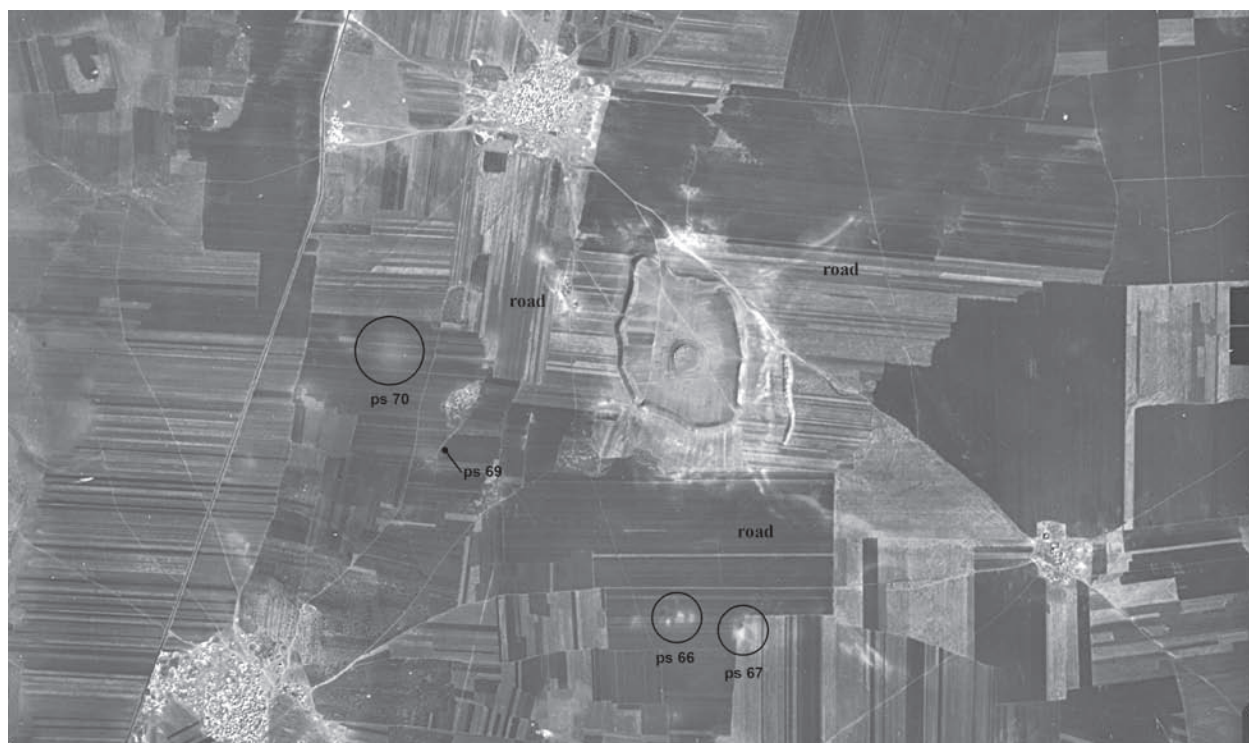


Figure 8.12. Detection of linear hollows and potential sites (PS) on the aerial photographs. PS 66, 67, and 70 are potential off-sites; PS 69 is a potential, probably destroyed, tell according to the toponym on French and Soviet maps (in the background a CORONA photograph).



Figure 8.13. Tell Abyad, the eastern outer rampart from the west.



Figure 8.14. Ebla, the eastern outer town with the MBA rampart to the left and the outer rampart to the right.



Figure 8.15. Ebla, MB I pottery from the outer town (sectors A, C, F, M) (drawings by Marta D'Andrea).



Figure 8.16. Ebla, basalt tools from the eastern outer town.



Figure 8.17. Ebla, pottery slags from the eastern outer town.

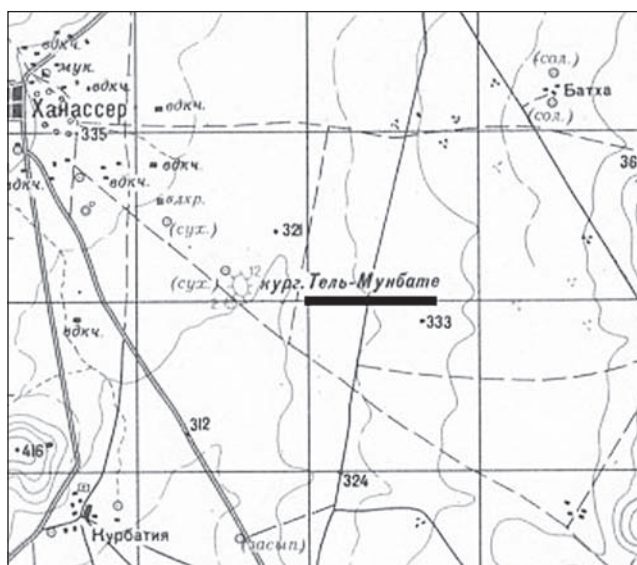


Figure 8.18. The site of Tell Munbatah on the Soviet map at 1:100,000 scale of the 1980s.

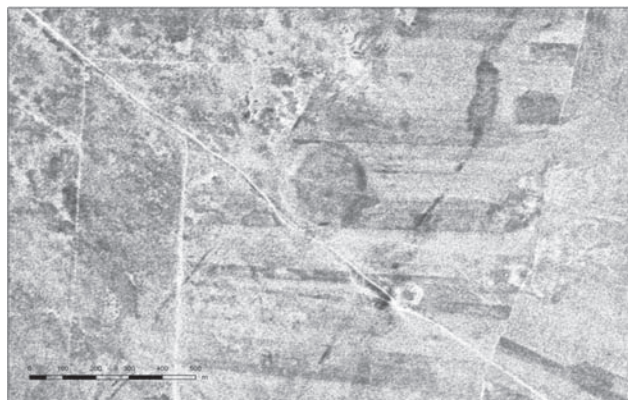


Figure 8.19. The site of Tell Munbatah on the CORONA satellite imagery of 1969.



Figure 8.20. Tell Munbatah from northwest (photo September 2010).

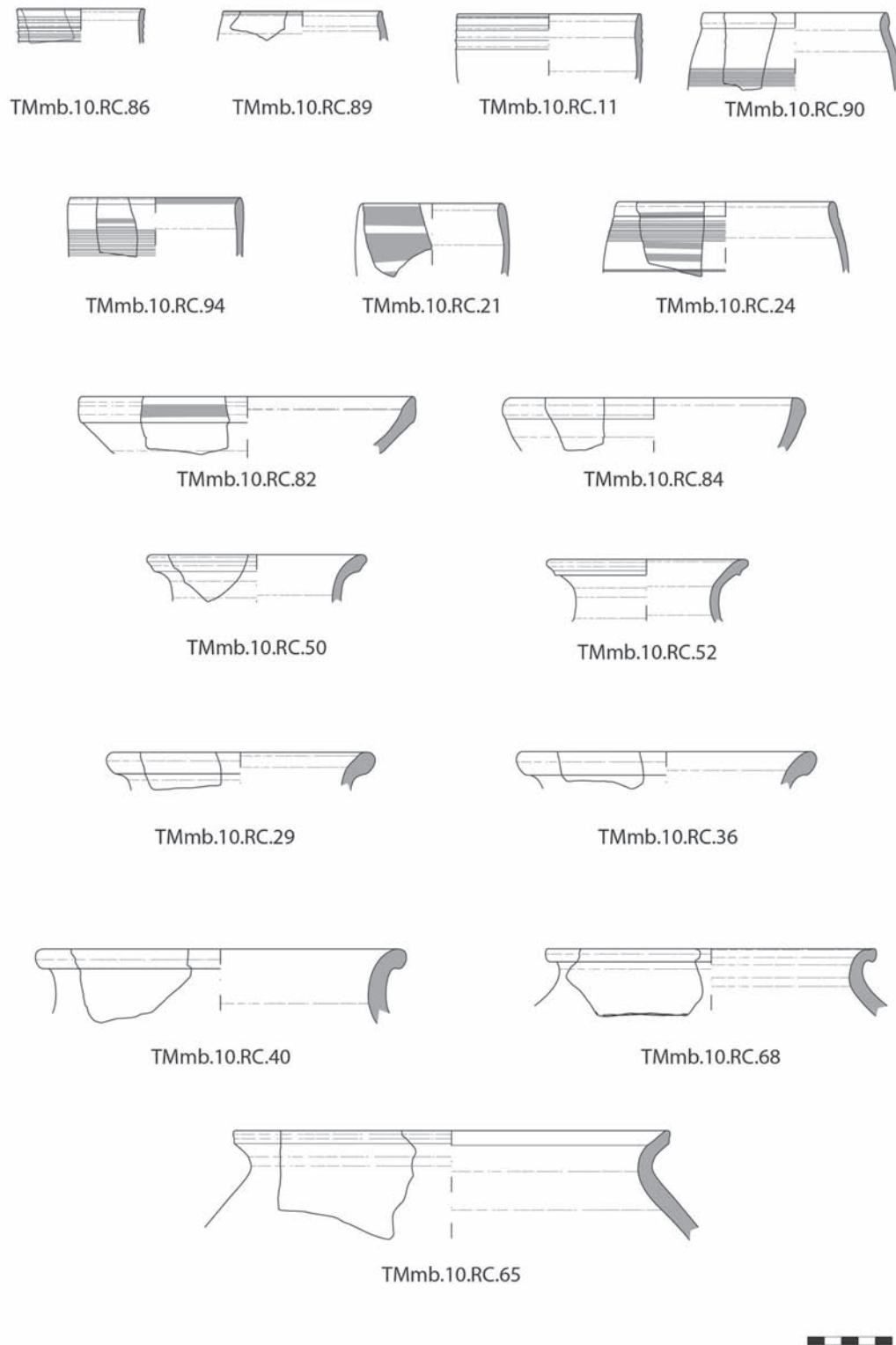


Figure 8.21. Sample of the EB IVB pottery from 2010 survey at Tell Munbatah (drawings by Marta D'Andrea; graphic elaboration by Marta D'Andrea and Agnese Vacca).

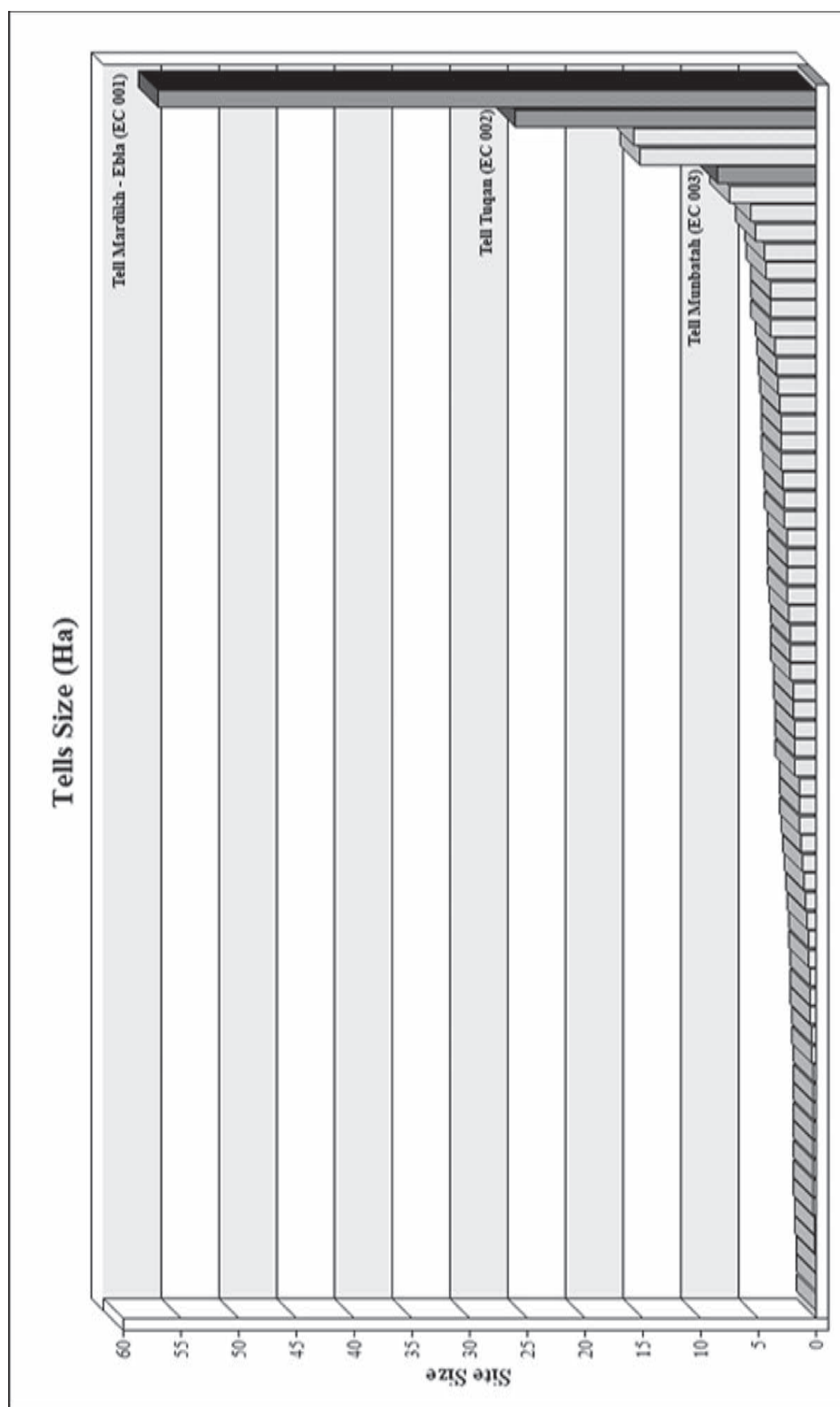


Figure 8.22. Classification of the sites of the Eblaite *chora* according to size.

CHAPTER 9

TRENDS IN VILLAGE LIFE

The Early Bronze Age Phases at Tell Tuqan

F. Baffi and L. Peyronel

1. INTRODUCTION¹

The site of Tell Tuqan (EC 002) is located about 45 km southeast of Aleppo and 14 km east of Saraqeb, on the modern road that from the major north-south route Damascus-Aleppo leads towards the steppe. The region surrounding the site is climatically characterized by the presence of an ancient lake basin that even nowadays is clearly distinguishable during spring, especially if the winter has been particularly rainy (see Cantelli, Martina, and Picotti in this volume). Tuqan is in fact located on the western limit of the Matkh depression, in which the Nahr el-Quweiq flows. Even today, but much more in the past, this situation has been optimal, generating an ecosystem that favored types of local vegetation and crops that thrive in a humid environment embedded in a broader dry or semidry context (see Rossi, Ventura, and Vignudelli, in this volume). The site lies at short distance from Ebla (ca. 14 km) and Tell Afis (ca. 17 km), and such proximity must have favored in the past the formation of a network of close contacts between the three sites (Figure 9.1). The tell covers a surface of ca. 26 ha, and the mound morphology is given by the Middle Bronze structures: the tell includes a lower and an upper town, the latter considerably off-centered towards the southwest (Figure 9.2). Each of these two urban sectors was surrounded by defensive walls, pierced by at least three gates.

The site attracted the attention of W.F. Albright, who visited it in two different occasions in

1925 (Albright and Dougherty 1926, 9) and 1932 (Albright 1933, 1) and, on the basis of surface pottery analysis, dated the settlement to the Early Bronze-Middle Bronze transitional period. Later on Liverani, during a survey in the region surrounding Tell Mardikh, confirmed this chronological description (Liverani 1965, 112–14), whereas Tuqan appears only in the map of Phase III (MB I-II) settlement elaborated by de Maigret after his survey in the Matkh region (de Maigret 1978, fig. 12; see also Mantellini, Micale, and Peyronel, in this volume). Between 1978 and 1993, four campaigns of soundings were carried out by the archaeological expedition of the Sapienza University of Rome, under the direction of Paolo Matthiae, thus defining a preliminary occupational sequence (Matthiae 1979c; 1982a; Baffi 1990; 1994; 2006a). Regular excavations by the archaeological expedition of the University of Salento have restarted the exploration of the site since 2006, under the direction of Francesca Baffi. The results of these activities were presented in two preliminary excavation reports (Baffi 2008, 2011a).

2. THIRD MILLENNIUM B.C. OCCUPATION

The site was settled from EB III to the Islamic period (Baffi 2011a, 5–12), although the virgin soil has been reached only on the acropolis in Area D, where the limestone bedrock was directly associated with a paving dating from MB IIA (ibidem, 145–49, figs. 2–4).

The EBA sequence includes up to now the following phases:

EB III – Tuqan IC ca. 2650–2450 B.C.;

EB IVA – Tuqan IIA ca. 2450–2300 B.C.;

EB IVB – Tuqan IIB ca. 2300–2000 B.C.

Evidence for the EBA settlement has been brought to light in the following areas in the Lower Town:

- Area P, EB III, IVA1 and IVB;
- Area A, EB IVB;
- Area G, EB IVB;
- Area N, EB IVB;
- Area E, EB IVA and IVB;
- Area L, EB IVB.

In the above-mentioned areas the evidence is differentiated: it is richer in Area P, associated to a series of architectural phases, and more sporadic in the other ones. Dating materials fall within the regional horizon of northern inner Syria, regarding both the EB III-IVA/Tuqan IC-IIA (Mazzoni 2002a, 73–76) and the EB IVB/Tuqan IIB (*ibidem*, 78–79).² Compared to the regional productions, the fabrics of the pottery from Tell Tuqan generally show a good level of purification and firing always at medium to high temperatures.

The materials collected from the various areas investigated generally showed typological and functional homogeneity, particularly in the case of sherds coming from areas with traces of plunder (Area A) or from which large quantities of earth were moved in order to carry out a specific urban project programmed and executed during the MBA (Areas G and E). It seems clear that, during various periods of the MB town's life, earth was taken from contexts that belonged to functionally organized areas from the EB IVB and moved to different sectors close to where the earth masses were going to be employed.

2.1. Area P–Southern Sector

The trench located in the southern sector of Area P (DhV6+DhV7) has been excavated between 2007 and 2010, identifying ten occupational phases (1–10) that span the Iron Age III (Phase 1, Tuqan VC) down to EB III (Phases 6–10, Tuqan IC). A long sequence of the EBA occupation is represented by Phases 4–10.

In Phase 4, four sub-levels (A–D) represent a domestic area dated to EB IVB (ca. 2300–2000 B.C.), with beaten-earth superimposed floors, storage bins and thin poorly preserved mud-brick walls (Peyronel 2008c, 21–28; 2011a, 62–64). The pottery shows diagnostic types of Simple Ware (small cups with pointed rims, straight sides, and flat bases; large bowls with a swollen rim; bowls with multiple vertical grooved rims; medium-sized jars with a short neck and thickened or beaded everted rim; ovoid jars with double rims) and Painted Simple Ware (goblets with black or dark-red painted lines; shallow bowls with a painted band under the rim and inside it; small-medium jars with everted or swollen rims decorated with painted lines), dated to a central-late EB IVB period (Figure 9.3) (Peyronel 2008c, 36–37, figs. 20–21; 2011, 89–90, fig. 29). Some goblets without paintings or with thin parallel incisions identify a very late EB IVB production (*ibidem*, fig. 21:7), and few sherds attest to specialized productions of pattern-combed jars and Smeared Wash Ware (*ibidem*, 37; Peyronel 2011a, 90; see also Mazzoni 2002a, 78–79).

Immediately below, two infant burial pits can be assigned to Phase 5 (Figure 9.4) (Peyronel 2011a, 64–65, fig. 30). D.772 is a deposition of a five-year-old infant with the skeleton placed at the bottom of an ovoidal pit sealed by mud-brick fragments and containing a corrugated goblet as funerary assemblage. D.778 is an irregular burial pit of a one-year-old infant with two goblets placed near the skull. The beakers can be dated to a final EB IIIB period, although only the specimen coming from D.772 finds precise parallels at Ebla. Therefore the sequence is marked by a chronological hiatus, since no EB IVA materials have been identified in the sounding.³ This negative evidence is probably due to the

limited extension of the sounding, since Tuqan was certainly occupied also during the twenty-fourth century B.C., when Ebla was at the zenith of its political power, albeit the extension of the settlement is difficult to ascertain, since at the moment EB IVA materials come from secondary deposits in Area E or have been collected from the surface.

A thick sequence of structures and associated deposits can be dated to EB III (Phases 6–10, ca. 2650(?)–2450 B.C.; Tuqan IC1–2), showing a major functional change between Phases 7 and 8, when an earlier atelier for pottery production (Phases 8–10) was replaced with an area for storing and processing agricultural products, mainly cereals and olives, equipped with silos, bins, and storage pits (Phases 6–7; see *ibidem*, 66–77; Peyronel and Vacca, *in press*). It is difficult to define the chronological range of these two main EB III occupations: the pottery is characterized by a marked continuity in classes, shapes, and fabrics; the lack of good EB III stratigraphic sequences from other settlements in northern Syria prevents a comparative chrono-typological analysis; and we do not know if the unexcavated levels below Phase 10 can be assigned to EB III or to an earlier EB II settlement.⁴

The later EB III Phases (6–7) are related to an open area for storing and crop processing in which circular or ovoid plastered silos lined with mud bricks, storage bins, and plastered installations have been identified (S.794, S.795, I.792, F.950+F.953: Phase 6A–B; S.781, F.953, S.962: Phase 7; S.769: both phases) (Figure 9.5). Compact layers of crumbled limestone were used as floored areas in between the storage installations (L.796, L.961), and small retaining wall of mud with limestone inclusions sometimes connected the silos.⁵

Thus the evidence from Phases 6–7 testifies to a context of centralization and accumulation of primary resources around the middle of the third millennium B.C., immediately preceding the floruit of the Mature Early Syrian period. However, the limited exposure prevents a more precise contextual and economic evaluation of the storage installations. At Ebla, a public

complex dating from EB III, equipped with circular silos and storerooms, has been partially excavated in Areas G South and CC, attesting to the centralization of primary products inside the building (Matthiae 1987, 136–38; 2000, 572–75; 2010b, 40–43; Dolce 2008b). On the contrary, a series of silos and bins brought to light on the acropolis at Mishrife (Morandi Bonacossi 2008, 68, 71–74) and dated to EB IVA cannot be directly linked to architectural structures.

Below Phase 7, other three EB III phases have been identified (8–10; Tuqan IC1), characterized by kilns, furnaces, pits, and several facilities and installations associated with pottery fragments, pottery slags, and overfired sherds. The area was used as a workshop for pottery manufacture during Phases 9–10, whereas Phase 8 (A–C) is related to architectural structures and floors (L.964, L.980, L.982, L.1137; M.777, M.983, M.987, M.992) equipped with small kilns, platforms, and lined pits full of ashes (I.979, I.991, I.993, I.984, I.1138), probably connected to handicraft activities but also to the processing of primary products (Figure 9.6). In particular, collapsed materials, mud-brick fragments, and smashed pottery come from a thick layer covering the burnt flooring L.980, divided by a small wall (M.983) and equipped with a kiln (I.979) full of ashes and a plastered square installation with a basin (I.991). Phase 9 attests to activities linked with the abandonment of the previous pottery workshop of Phase 10. Paving and levelled surfaces, cut by refuse pits filled with ashes, animal bones, and plant remains, are associated with layers rich in vitrified mud-brick fragments, pottery sherds, and slags.

In the earliest EB III exposed levels (Phase 10), a pottery manufacture area with three large kilns has been identified (Figure 9.7). Only one kiln (I.1131) was in use at the moment of the final abandonment of the workshop: this is 3.5 m wide and has a rectangular plan with the southern and northern sides built with vitrified mud bricks and with a pisé partition wall, supporting the baking holed platform that is completely missing.⁶

The second kiln (I.1134) has a circular shape, 3 m wide and 40 cm deep, with the original

opening placed on the northeastern side. It was dismantled at its final phase and the pit was filled with a large quantity of broken pottery. A probable third kiln, not excavated, is located in the northeastern sector, filled with an ashy layer and largely cut by a pit of Phase 9 (F.776) (Plate 17).

The evidence of pottery production, albeit coming from a limited exposure in the trial trench of Area P, is up to now without comparison with other EB III sites in the region, providing important information on this kind of craft specialization in northern inner Syria. The kiln and installations attest to the high level of specialization reached around the middle of the third millennium B.C.⁷

The EB III pottery from Phases 6–10 shows a marked continuity in shapes and fabrics, and it finds comparisons with assemblages coming from Amuq H, Hama K 4–1, Mardikh IIA, and Qatna Operation J 43–39 (Mazzoni 2002a, 73–75; Peyronel 2011a, 90–91, figs. 30–33). The ceramic materials from Phases 6–7 are characterized by sherds discarded in secondary contexts without complete shapes (Figure 9.8). Simple Ware is represented by deep bowls with a straight or sinuous profile and everted rim, large bowls with inturned rims, medium-sized jars with short necks and everted or beaded rims. Painted Simple Ware is scarcely present with jars decorated with a geometric pattern of horizontal, wavy, and crossed lines. Cooking pots are always related to a general type with globular body, flat base, and vertical stepped rim.⁸

The ceramic horizon related to Phases 8–10 is better documented, with several vessels found especially in L.964 and L.980 (Phase 8A) and in the kiln and pits of Phase 10 (Figure 9.9). Simple Ware is represented by small, deep bowls with a curved profile or with a slight low carination and everted rim, in some cases showing a horizontal reversed slip; large platters with flattened or inturned rims; and jars with everted beaded rims and short necks, usually in a distinctive well-fired pinkish or buff fabric. A unique specimen of an ovoid jar with a narrow and short neck and outturned rim in a fine whitish-yellow clay has been found in the dismantled kiln I.1134.

Painted Simple Ware continues to be attested by few sherds that indicate everted rim jars decorated by crossing and waving lines and small deep bowls with irregular wavy lines.⁹

It is interesting to note that the pottery coming from the manufacture area of Phase 10 is homogeneous, with few types of vessels, mainly plain Simple Ware (deep bowls and jars with beaded rims and short necks, several bearing the same incised potter's mark—a curved line crossing an horizontal one or an arched incision) and cooking pots with vertical stepped or everted rims, with a small percentage of Painted Simple Ware. The few recurrent types strongly suggest that the kilns were used to fire vessels produced by the specialized ateliers located in the proximity of the furnace area (Peyronel and Vacca, in press).

2.2. Area A

The data related to the EB IVB settlement comes from the sector occupied during the MBA by the northeastern city gate. As a result of the foundation of the new mighty stone structure of the gate, masses of earth from the earlier occupation were thrown against the walls. The excavations shed light on how the various structures of Gate A were set on an even terrain mixed with traces of fire containing EB IVB sherds. But where the project of the gate included open, unbuilt spaces, a different documentation was obtained: in the inner part of the city, just next to the tower flanking the gate, under a flat flooring (identified in FiVII10) on which a plastered installation was found, two EB IVB jars were uncovered, untouched by the overlying layers, each containing a child burial (Baffi 2006a, figs. 11, 12, here Figures 9.10, 9.11), a clear indication of the use of the area as burial grounds in the later phase of the third millennium B.C. During this time the urban asset and the dimensions of the settlement differed considerably from the subsequent phases. In the area facing the outer side of the city gate, in FIVI12, the upper part of a EB IVB wall (M.17) was brought to light (Figure 9.12), built with bricks of different color and dimensions from the ones employed in the walls of the towers flanking

the gate (*ibidem*, 28–35). The large, roughly cut stones that formed the majority of the elevation of the side towers of Gate A were set over what was left of the top of wall M.17, partially cut by the MB foundations themselves. This situation suggests a different extension of the EB town compared to the MBA one, clearly dislocated northwards, while there is no proof that M.17 was part of a defensive system dating to the third millennium B.C.

The pottery collected can be ascribed to a late phase of EB IVB (Figure 9.13), with a strong presence of Painted Simple Ware (Fiorentino 2006a, 55–56); the fabrics are those peculiar to the site, in greenish to very light grey or whitish in color. The clay is well sieved and shows high firing. Preservation Ware is scarcely represented, while well attested are the goblets with a decoration of incised and painted red or black horizontal bands alternating with waves. The horizontal stripe decoration is also found on small jars with flaring rim. The most common types are goblets with ribbed outer surface, bowls with flaring walls and slightly thickened or ribbed rim, and small jars with short neck and outturned rim.

Small finds are very scarce; among these is a clay female figurine (Fiorentino 2006b, 116, fig. 49a), referable to a late phase of EB IVB, characterized by long braids on the chest and thick body with a barely modeled waist.

2.3. Area G

This sector is located on the northern slope of the defensive circuit, west of Gate A (Baffi 2006a, 18–25). The excavation activities of the 1980s brought to light the MB II integration of the MB I rampart fortification system with the construction, on top of the rampart, of brick walls built along a system of broken axes and connected through circular towers serving as outer and inner lookout points. Such a complex system represent an evolution of the basic one and must have been designed for a different purpose: even taking into consideration local variants, the new system fits well into the process of strengthening and monumentalizing of Syria's

urban defenses (Baffi 2010; *in press*). Tell Tuqan's defensive rampart, as the one from nearby Ebla, contained materials from the previous settlement phase. Pottery sherds dating to EB IVB appeared in great numbers immediately underneath the surface layer, sloping steeply along the side overlooking the countryside north of the city. The terrain that formed the rampart showed all the traits of reuse, with mixed traces of destruction; the earth layers were not simply thrown one atop the other, but were assembled in such a way to contain each other. By contrast, in the case of Ebla, it was established that in the northwestern rampart the earth layers were contained in terraces degrading northwards, formed by compact terrain mixed with rubble. A terracing platform was also documented, made of particularly compact beaten-earth flooring and contained by a short stretch of wall. Materials collected are all evenly dating to EB IVB, and typical of refuse earth: abundant fragments, all of very small dimensions, never belonging to complete vessels.

The pottery shows strong chronological analogies with that collected in Area A, thus belonging to a late phase of EB IVB (Fiorentino 2006a, 52), with a balanced presence of open and closed types (Figure 9.14). Particularly well documented are the small bowls with ribbed outer rims and the small jars with short necks and slightly outturned rims. Painted Simple Ware is poorly attested, only in the type of the goblet with natural rim. Kitchen Ware is scarce.

2.4. Area N

Pottery sherds dating to EB IVB have been retrieved in the northwestern sector of the Lower Town, on the inner slope of the rampart, below the MB occupation. They are related to a modest domestic area of the MBA, with a graveyard partially disturbed and reused (Ascalone 2011, 45). While an association with modest remains partially disturbed by upper layers is possible, it cannot be ruled out that the materials come from the underlying rampart. Among the most attested Painted Simple Ware types are the goblets with a bell-shaped footed base and black, brown, or red

painted decoration; the small bowls with ribbed rims; and the small jars with short necks and outturned rims (Figure 9.15).

2.5. Area E

This area is occupied by structures belonging to the MB II fortification of the acropolis. During this period, the Upper Town was equipped with an inner fortification circuit (Baffi 2006a) that protected it to the north, thus visibly separating it from the Lower Town. The defense was formed by a thick walling of mud bricks, on the lower part of which an earthen rampart was built; from the top of the latter, square towers were built at regular intervals in a later phase (Matthiae 1982a, 321–24). Large quantities of earth were taken from the nearby areas of the Lower Town and were thrown from the top towards the base, to be finally contained by a modest lining of middle- to small-sized stones. These earth layers contained mixed sherds of both the EB IVA and IVB periods (Fiorentino 2006a, 60). It seems likely that these belonged to quite homogeneous contexts, judging from the typologies: among the EB IVA sherds, the majority are Preservation and Kitchen Wares (Figure 9.16). Among the former are the large jars with an almost vertical outturned rim, in light brown fabric and medium-high firing, or grayish or brownish fabric with medium-low firing. In both cases there could be a slight whitish wash, such as in the specimens attested at Royal Palace G of Ebla (Mazzoni 1982, 173). Among Kitchen Wares the prevailing type is the pot with natural flaring rim, also well attested at Ebla (Mazzoni 2002a, 77–78, plate XLI:104–6); also present are the goblets in light yellowish clay and ribbed external surface. Concerning the EB IVB pottery, painted goblets, mostly with black bands, are well attested, as are small jars in both light-brown high-fired clays and in greenish, very porous fabric with low firing. Clearly the excavation of the earth containing these types of materials had to be located in the south-central sector of the Lower Town: here, in Area P, the layers of phases dating to EB III–EB IVB are well documented, and in the MBA a large space free of structures was present around the acropolis (Ascalone 2008, 15–19).

2.6. Area L

This area is located on the eastern limit of the Lower Town, near the rampart, in a sector that in antiquity faced the lake basin. Documentation from this area belongs to a series of phases dating from the EB IVB to the late Hellenistic Period (Peyronel 2006a, 180).

Regarding the third millennium B.C. phase, this was identified below pillage pits dug during IA I cutting the layers dating to MB I and II. The pottery collected was not associated to any structure, and documentation is limited to a small number of sherds dating to the late EB IVB. Materials seem to belong to homogeneous contexts, similarly to what was observed in other instances in which medium and small types are prevailing, with a complete absence of Preservation Ware and a very scarce presence of Kitchen Ware. Specimens of Painted Simple Ware include goblets with bands painted in black, brown, or dark red and wide bowls with thickened outer rims or ribbed vertical rims; jars are rare, with short necks and rounded rims.

3. CONCLUSIONS

Based on the still scanty evidence dated to the EBA, we can advance the following concluding remarks:

- a. The site of Tell Tuqan seems to have been densely occupied during the EB IVB period, mainly during the last two centuries of the third millennium B.C. Data collected from different excavation areas show that notwithstanding the probable removal of a large amount of earth from the previous occupation during the urban planning and the construction of the massive rampart at the beginning of the MBA, architectural structures related to private dwellings and simple burial pits were present both at the centre of the site (Area P) and to the periphery (Area A).
- b. The presence of a large amount of EB IVB pottery sherds on the fortification and on the rampart protecting the Acropolis is

indicative of the use of earth removed from the previous settlement for the massive rampart construction, according to a system that was well known in Ebla in the same period (Matthiae 2001).

- c. On the contrary, EB IVA materials are scarce and always coming from secondary contexts, mixed with later EB IVB pottery sherds. The EBA occupational sequence in Area P has not yielded layers dated to the Mature Early Syrian period, but only two child burials, which can be assigned, on the base of the goblets found as funerary offerings, to a period immediately preceding Royal Palace G at Ebla. It is therefore possible that during the period of the Eblaite domain (ca. 2400–2300 B.C.) Tell Tuqan was a small centre and that it quickly developed after the collapse of Ebla.
- d. The evidence coming from the deep sounding in Area D on the upper town has revealed a series of levels with MB I-II materials directly overlying the limestone bedrock without any stratification linked to the EBA. It is therefore probable that, if there was an EB IV occupation, this part of the Acropolis was completely cut and removed in connection with the construction of the inner rampart. As an alternative, but it seems unlikely, the MB upper town was founded in an area not settled during the previous period.
- e. A long sequence of EBA superimposed levels is present in Area P, where thick deposits attest to a long occupation dating from the EB III, with archaeological evidences of an atelier for pottery production then replaced by an area with crop processing and storage facilities for agricultural products. Thus, at the centre of the site we have strong evidence of a settlement dated before the half of the third millennium B.C., although the virgin soil has not yet been reached, making it impossible to determine the time of the first occupation at the site.

Tell Tuqan was certainly an important regional centre during the EB III-IV periods, controlling the fertile area of the Matkh basin and the commercial routes linking Ebla to the settlements

located at the arid margins such as Tell Munbatah, which in turn gave access to the Jabbul plain.

NOTES

- 1 L. Peyronel wrote § 2.1, while F. Baffi wrote § 2.2–2.6. Introduction and conclusions were written together.
- 2 The documentation of the latter phase has been noticeably improved in recent times with the reconstruction of the stratigraphic sequence following the excavation of Area HH at Ebla (Matthiae 2007, 507–12; 2009d, 755–58), whereas the funerary assemblages retrieved in the tombs at Umm el-Marra (Schwartz et al. 2006; Schwartz et al. 2006 2012) integrate the documentation of the EB IVA pottery from Royal Palace G and Building P4 at Ebla (see the contributions by Marchetti, Mazzoni, and D’Andrea and Vacca, in this volume).
- 3 This phase is attested at Ebla and it has been labeled by Mazzoni as EB IVA1. It is characterized by the beginning of the caliciform pottery production, which fully develops during the Mature Early Syrian period documented by the ceramic assemblage of Royal Palace G (Mazzoni 1991b, 173–75; 2002a, 76).
- 4 In the excavation report, Phases 6–7 have been assigned to EB IIIB and phases 8–10 to EB IIIA, although this conventional division has been used to mark the functional change in the area (Peyronel 2011a, 66). Moreover, the whole EB III sequence has been roughly dated 2650–2450 B.C., according to pottery comparisons from the Ebla, Hama, and Amuq sites, but this is currently being verified through radiocarbon determinations by Calcagnile (CEDAD Lab of the University of Salento). For the 14C dates from Areas T (IA) and D (MB) on the Acropolis see Calcagnile et al. 2011.
- 5 The preliminary paleobotanical determinations carried out by Fiorentino (University of Salento) reveal the presence of charred carporemaines of wheat and barley and olive stones, concentrated in the fillings of the silos together with animal bones (mainly cattle and ovicaprids, but also gazelle and hare) (see Minniti 2011, 323–24) and pottery sherds. Therefore it seems probable that these installations were employed as refuse pits after their original storage use.
- 6 The kiln should be a vertical kidney-shaped type, with the combustion chamber partially buried under the ground, and with a superimposed baking domed chamber separated by a holed platform. Similar updraft kilns are attested from the fourth millennium

B.C. until Late Bronze Age. In the Levant, the better comparison comes from Tell Arqa, where a kiln dated to MB I has a very similar structure: see Thalmann (2006, 37–40, fig. 10).

- 7 Most of the evidence on pottery manufacture comes from the Euphrates valley, where EB III-IV circular or horseshoe kilns were discovered at Tell Habuba Kebira, Tell es-Sweyhat, Tell Abr, Tell Halawa A, and especially at Tell Banat: see Cooper (2006a, 183–201) and Peyronel and Vacca (in press).
- 8 A fragment of a jar shoulder bears a cylinder seal impression showing a herringbone-like pattern, which can be compared with jar sealings dating to the EB III from Tarsus and Byblos (Mazzoni 1992, plates 33: B98, 34: B103, 37: B134). A sherd of a thin-walled carinated beaker in Metallic Ware has also been found and it can be considered an import from the Jezirah.
- 9 This local painted production, attested also at Ebla in the same period (Matthiae 2000, 37), could have been inspired by Multiple-Brush Painted Ware, well documented in the Amuq plain during Phases G and H (Braidwood and Braidwood 1960, 281–87, 356–58). Another local decorated pottery is the incised ware, documented by few specimens of large bowls with wavy lines below the rim and jars with crossed lines on the shoulder. Three sherds of red-black burnished ware prove that this peculiar pottery was also present at Tuqan during EB III.
- 10 It would be useful to recover some measures of local soil erosion available at ICARDA (Aleppo), as mentioned in my original report.



Figure 9.1. Tell Tuqan and the Ebla region (CORONA image).

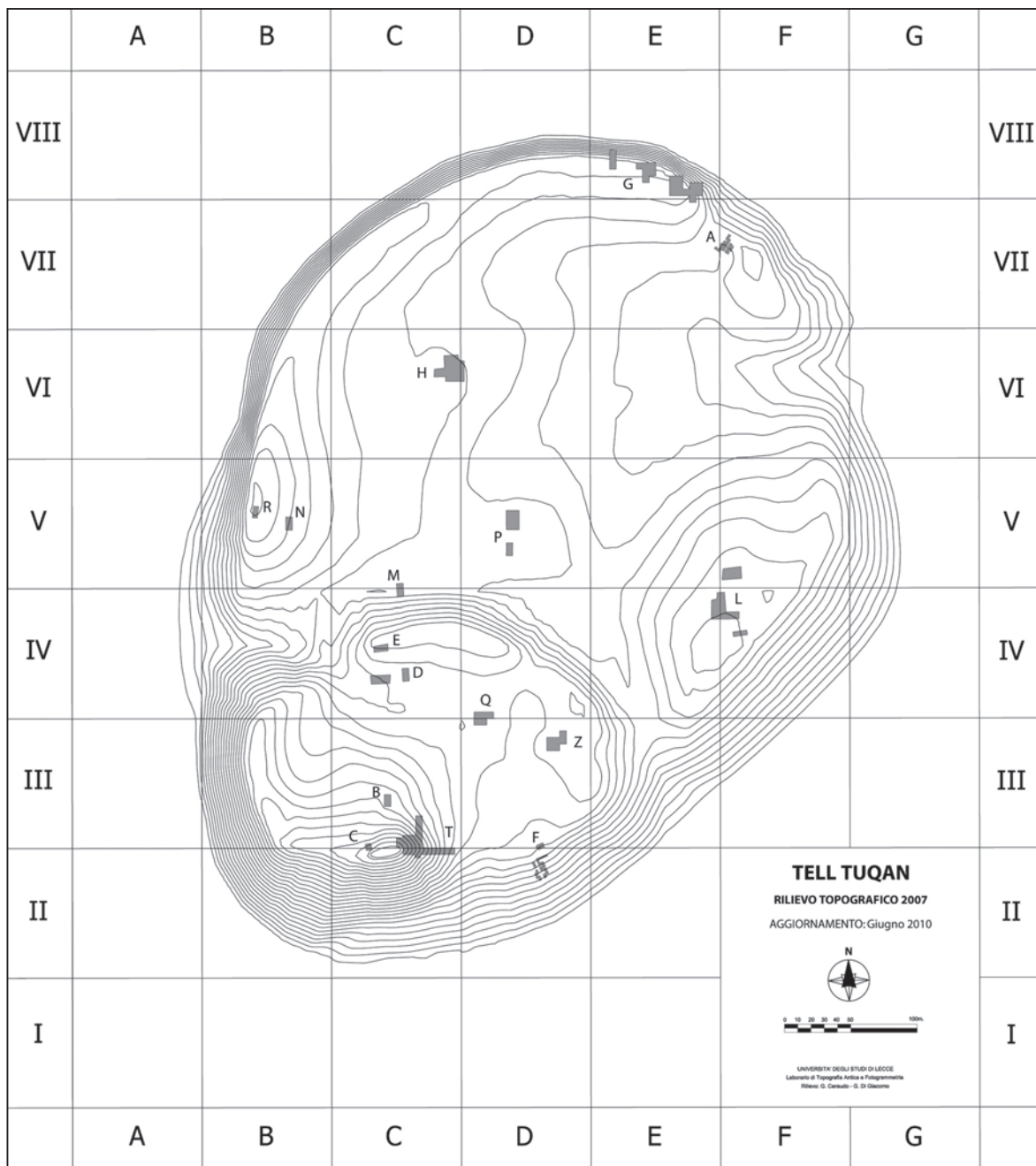


Figure 9.2. Tell Tuqan, topographic plan.

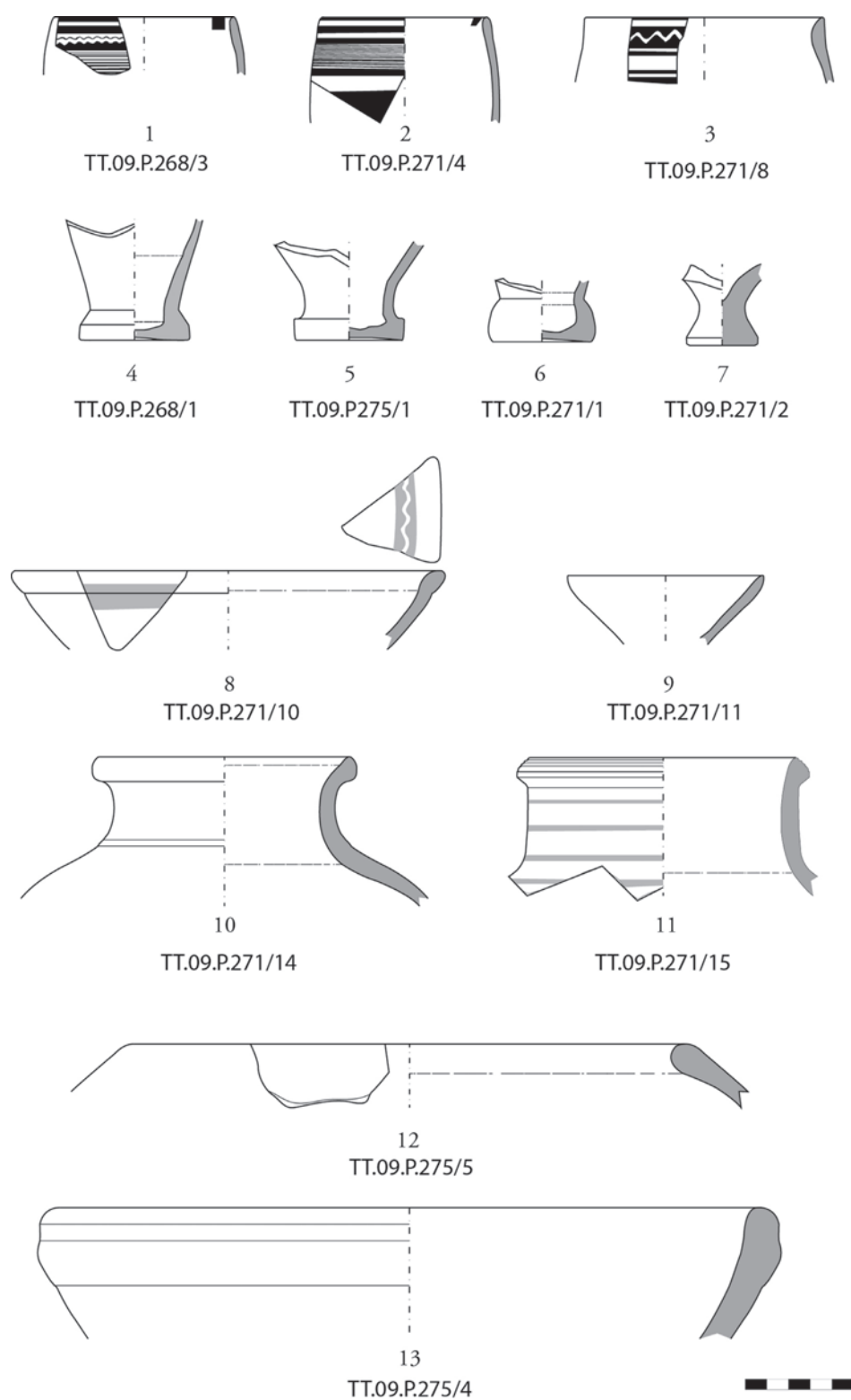
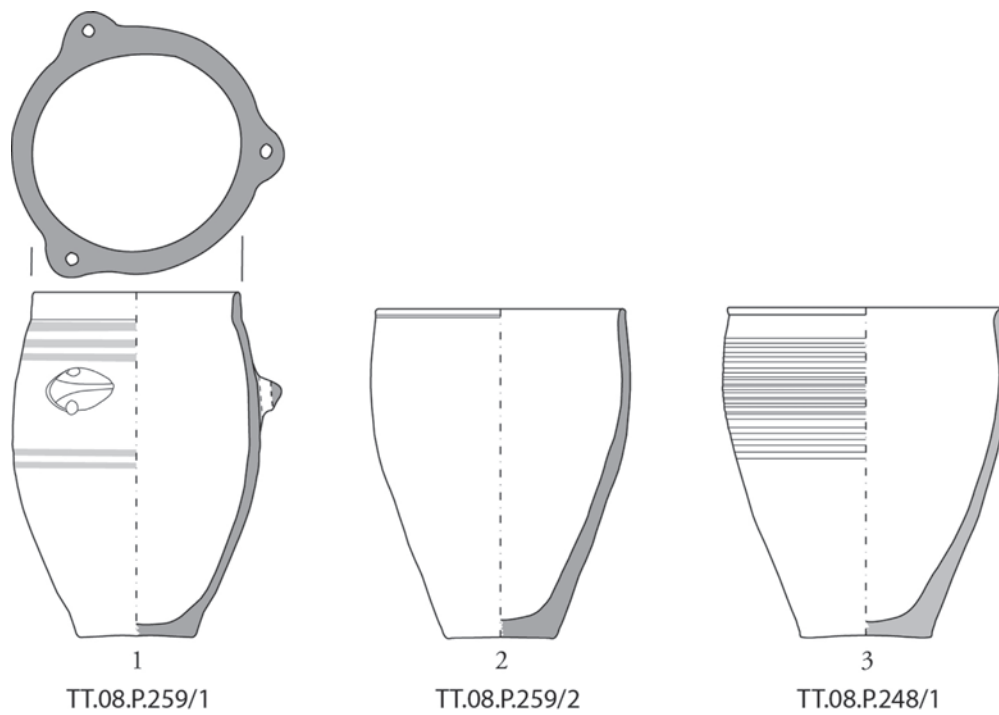


Figure 9.3. Tell Tuqan, EB IVB Pottery from Area P, Phase 4.



4

Figure 9.4. Tell Tuqan, EB IIIB pit burials D.772 and D.778 from Area P, Phase 5. 1–2. D.778; 3. D.772; 4. Pottery of pit burials D.778 and D.772.

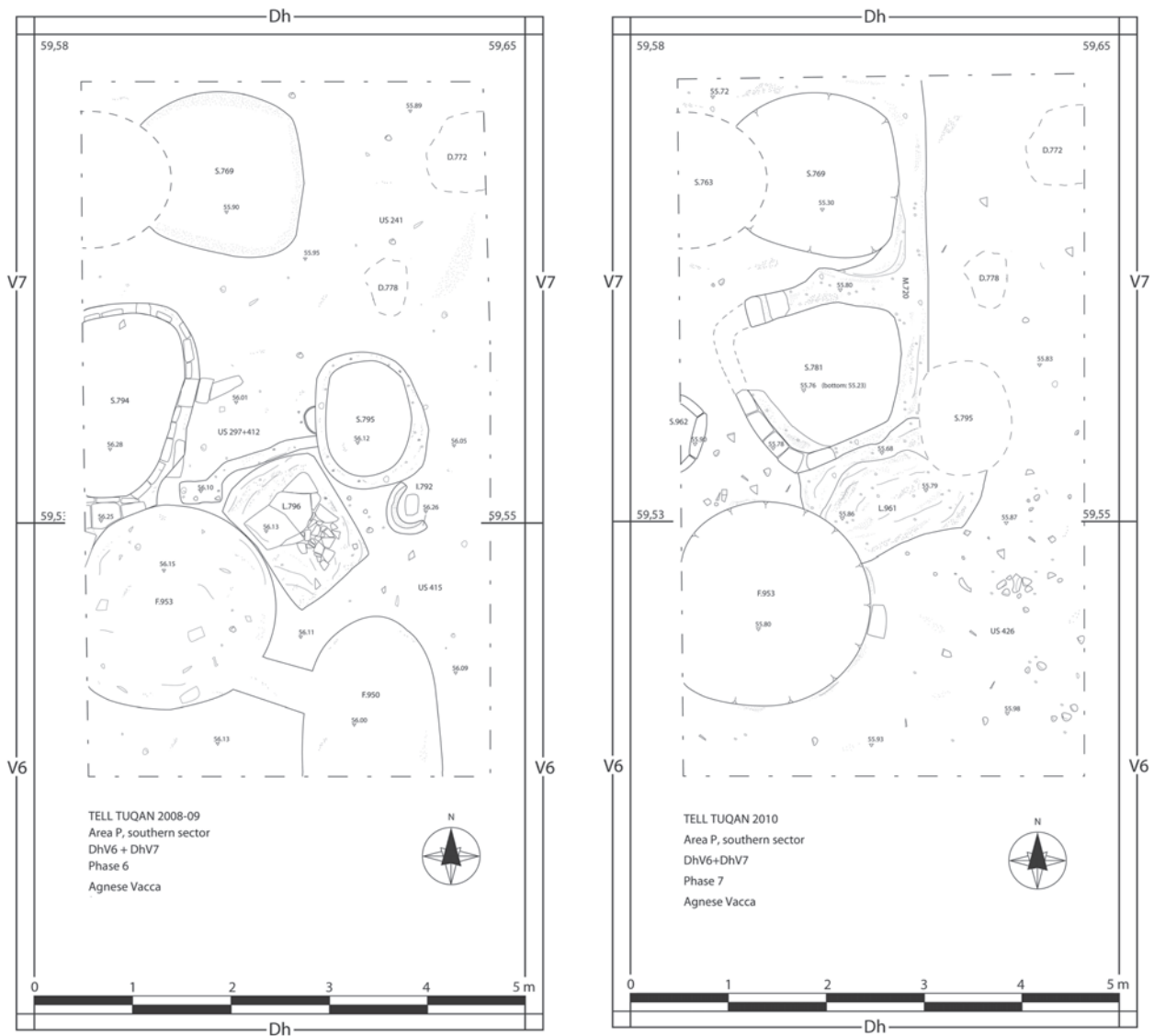


Figure 9.5. Tell Tuqan, Area P, silos and storage facilities from Phases 6–7, EB III.

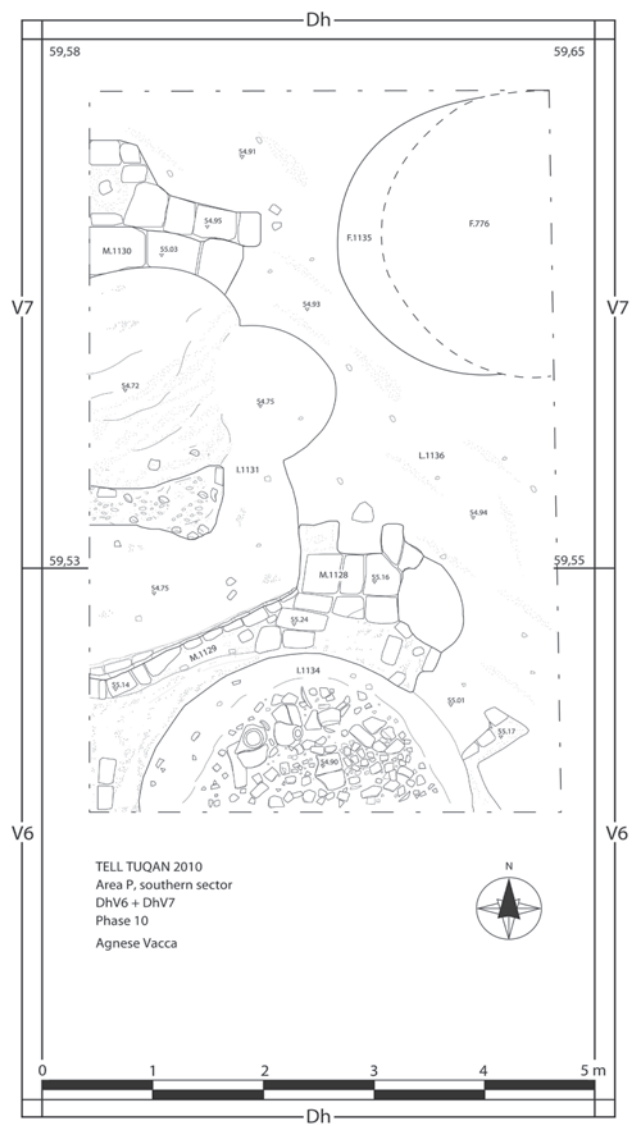
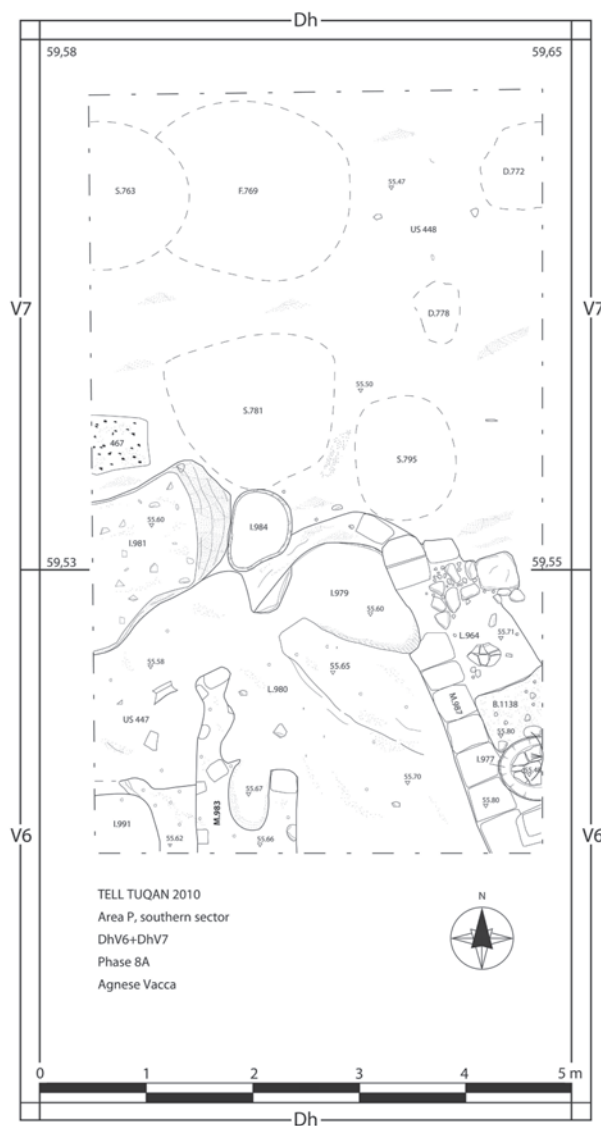


Figure 9.6. Tell Tuqan, Area P, structures of Phase 8, EB III.

Figure 9.7. Tell Tuqan, Area P, plan of Phase 10, EB III.

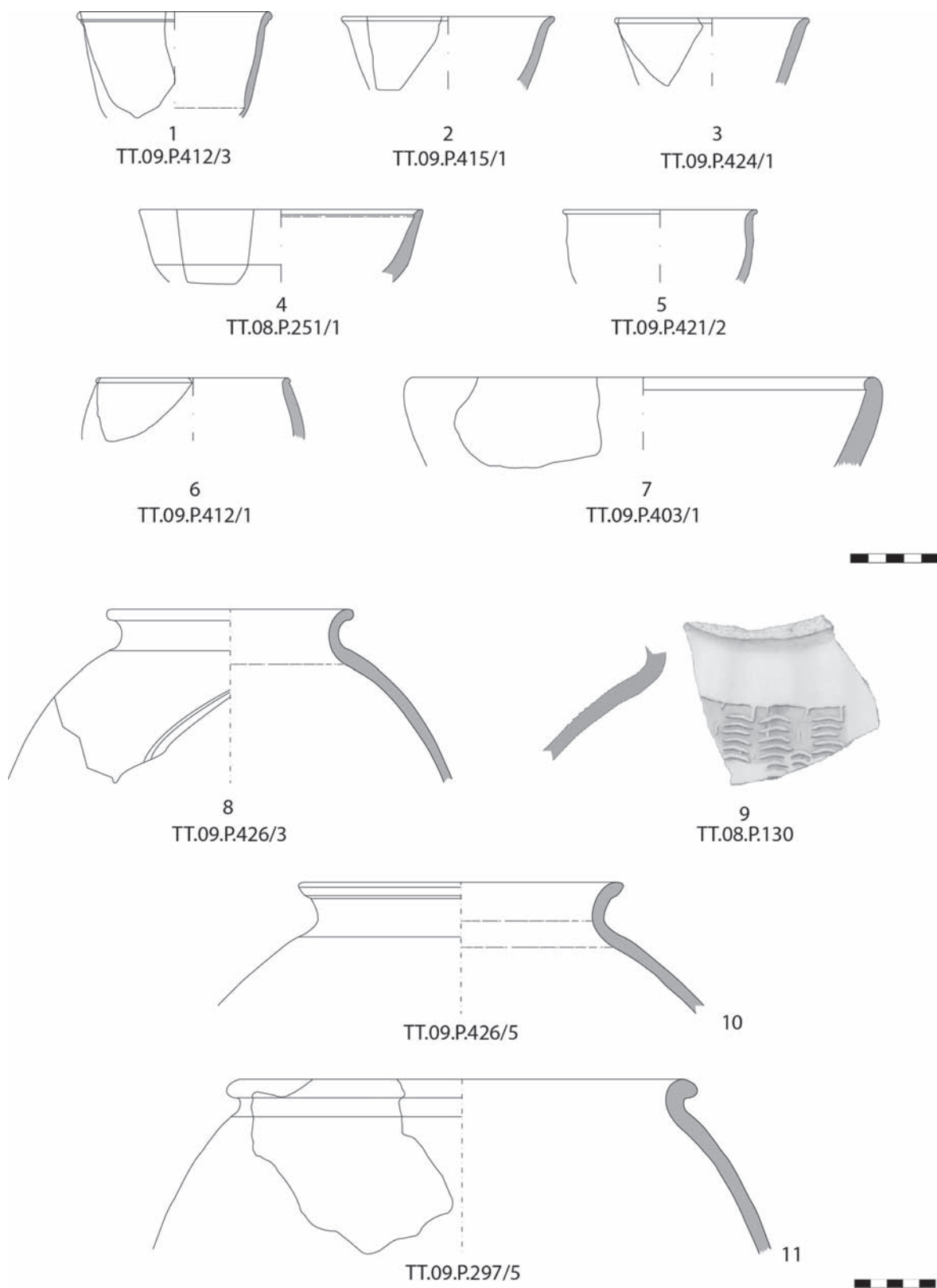


Figure 9.8. Tell Tuqan, Area P, EB III pottery (Phases 6–7).

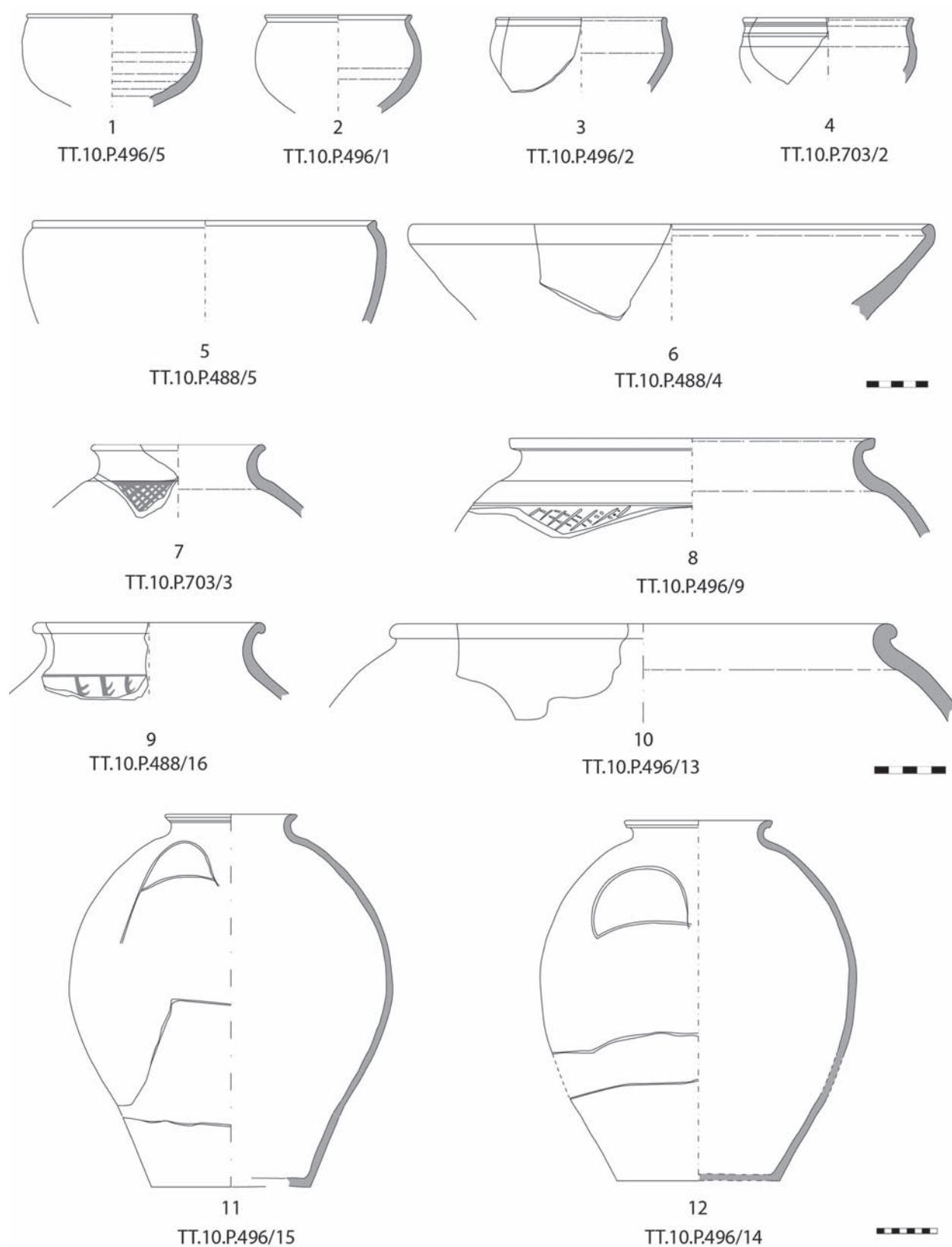


Figure 9.9. Tell Tuqan, Area P, EB III pottery (Phase 10).

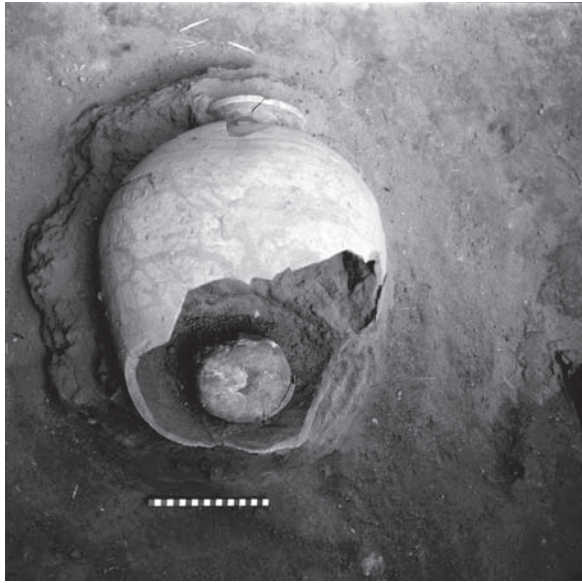


Figure 9.10. Tell Tuqan, Area A, EB IVB child burial.



Figure 9.11. Tell Tuqan, Area A, EB IVB child burial.

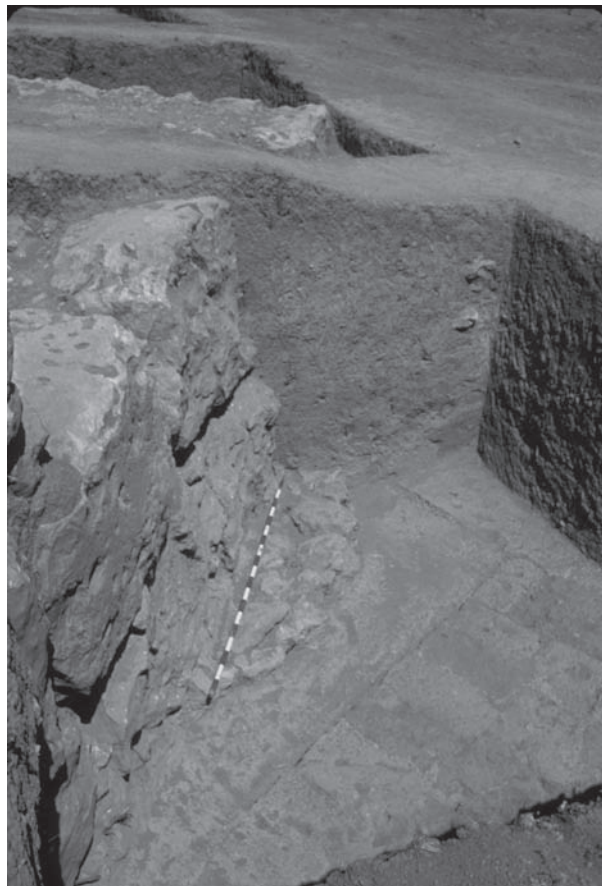


Figure 9.12. Tell Tuqan, Area A, EB IVB wall M.17.

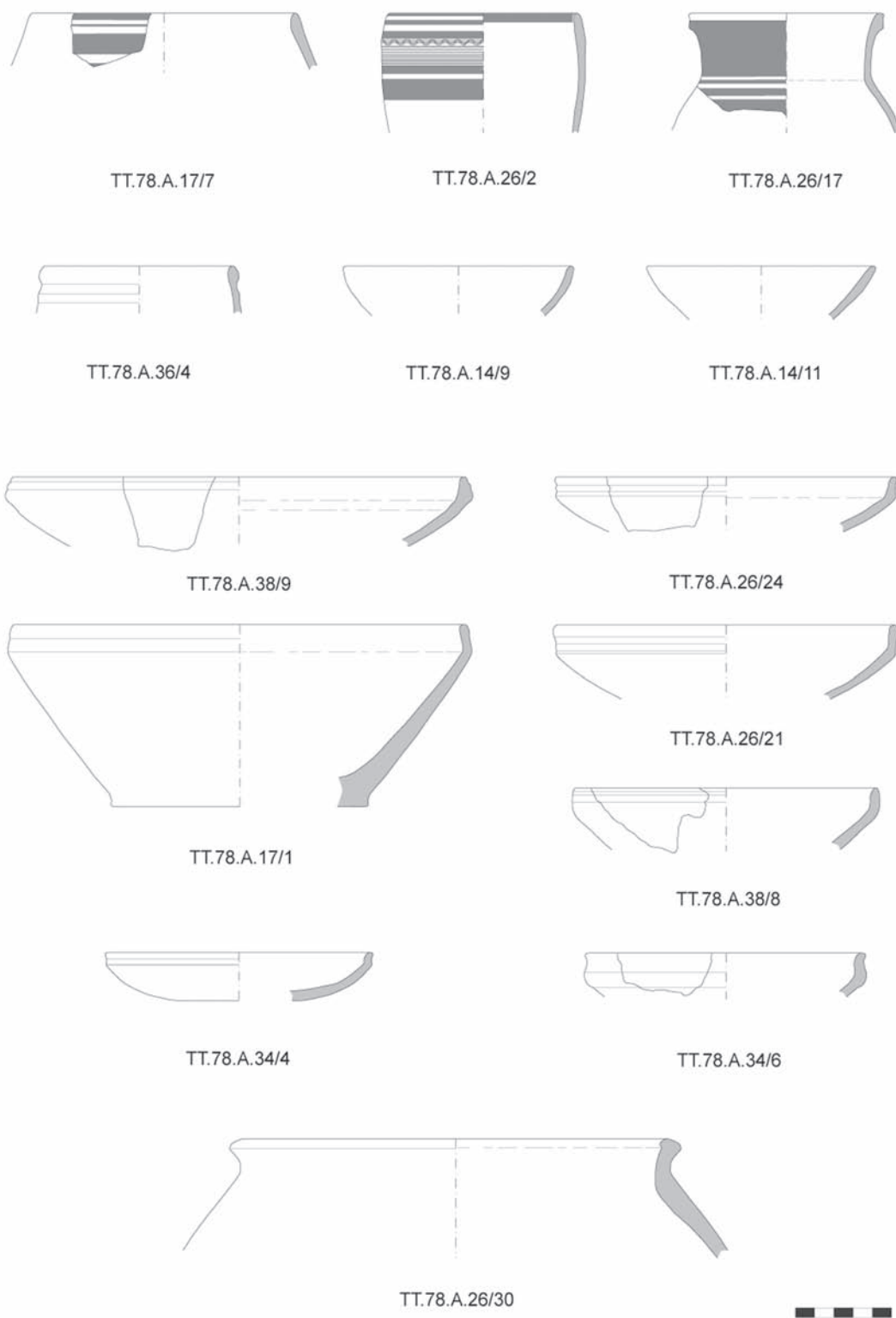


Figure 9.13. Tell Tuqan, Area A, late EB IVB pottery.

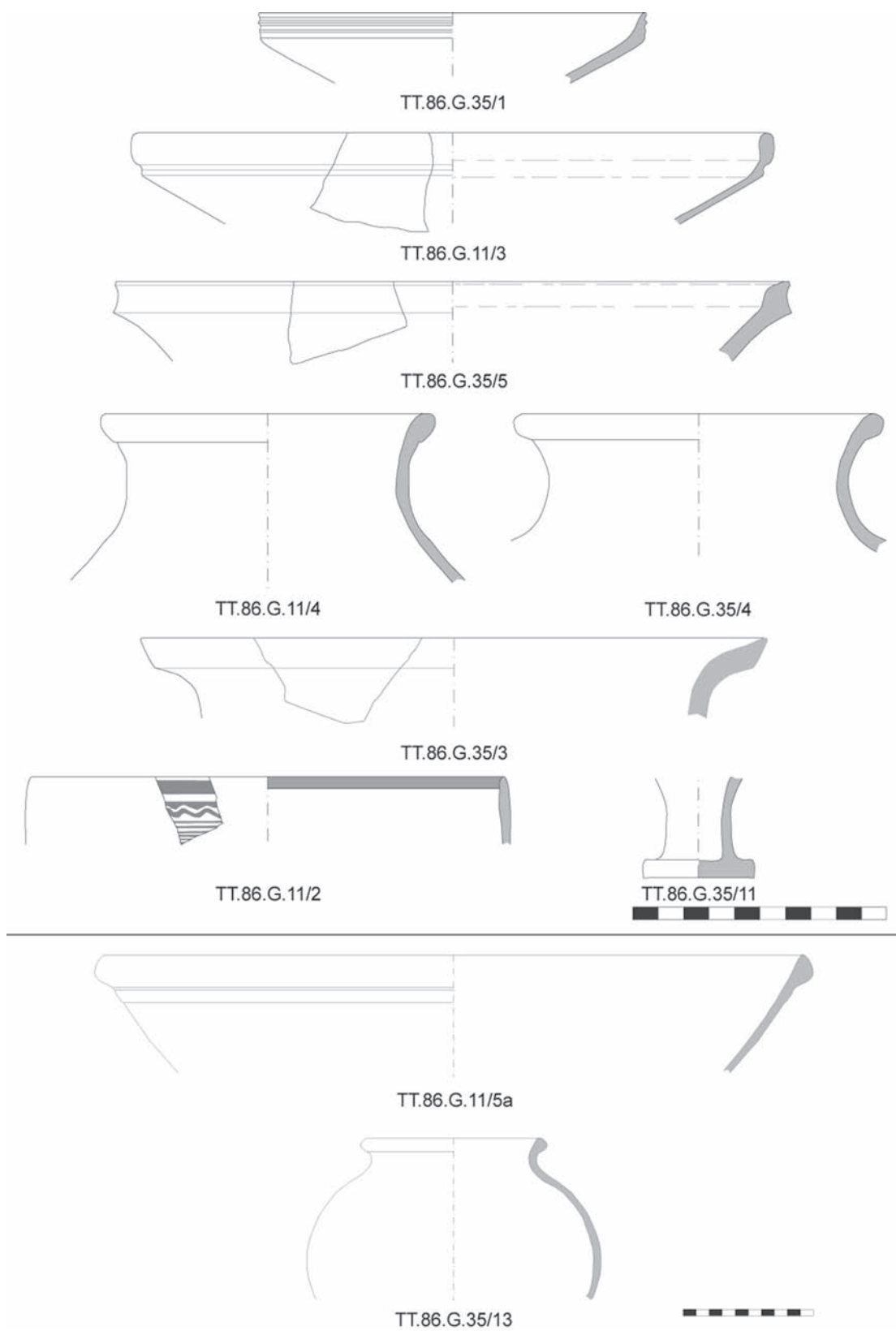


Figure 9.14. Tell Tuqan, Area G, late EB IVB pottery from northern rampart.

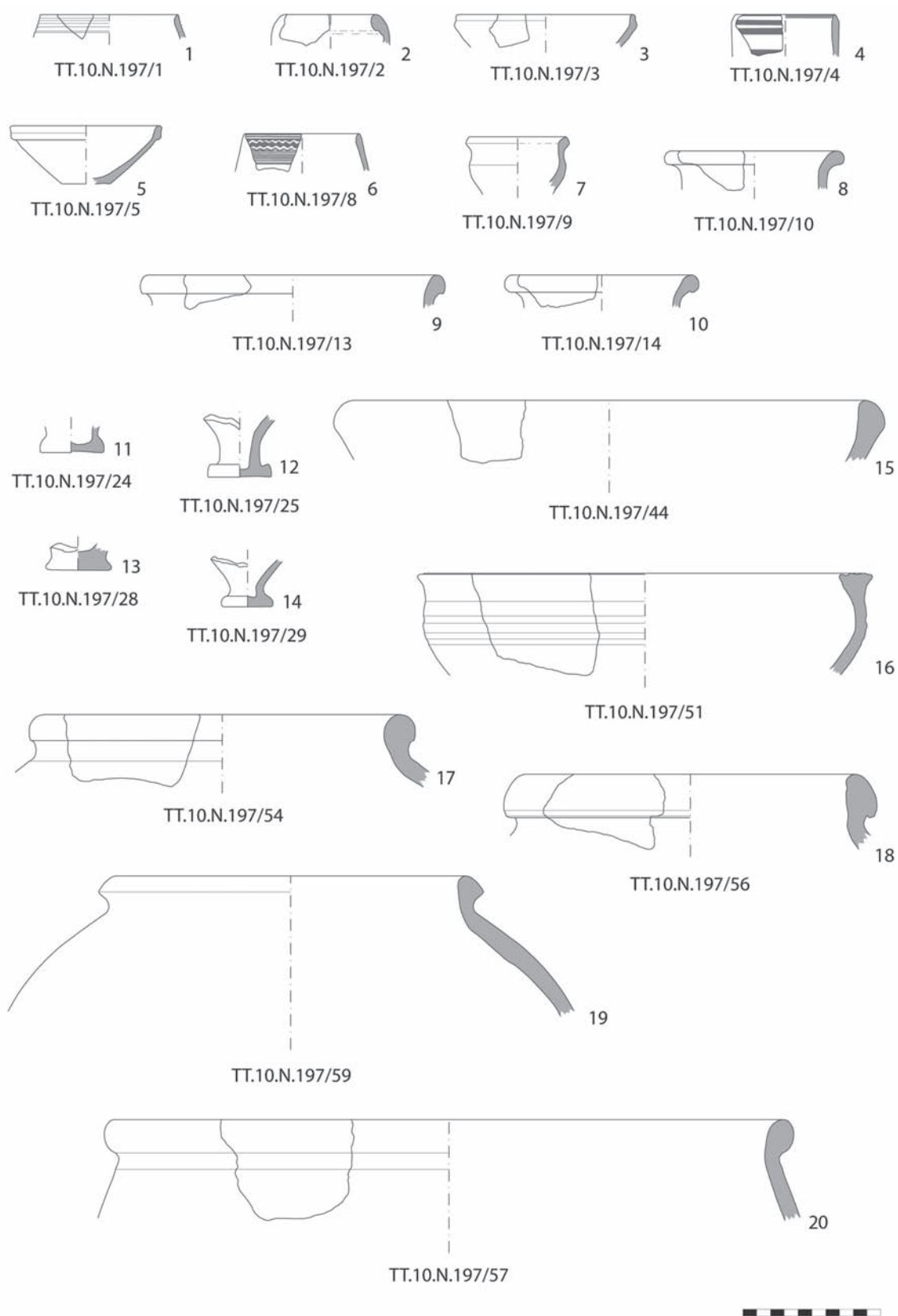


Figure 9.15. Tell Tuqan, Area N, EB IVB pottery.

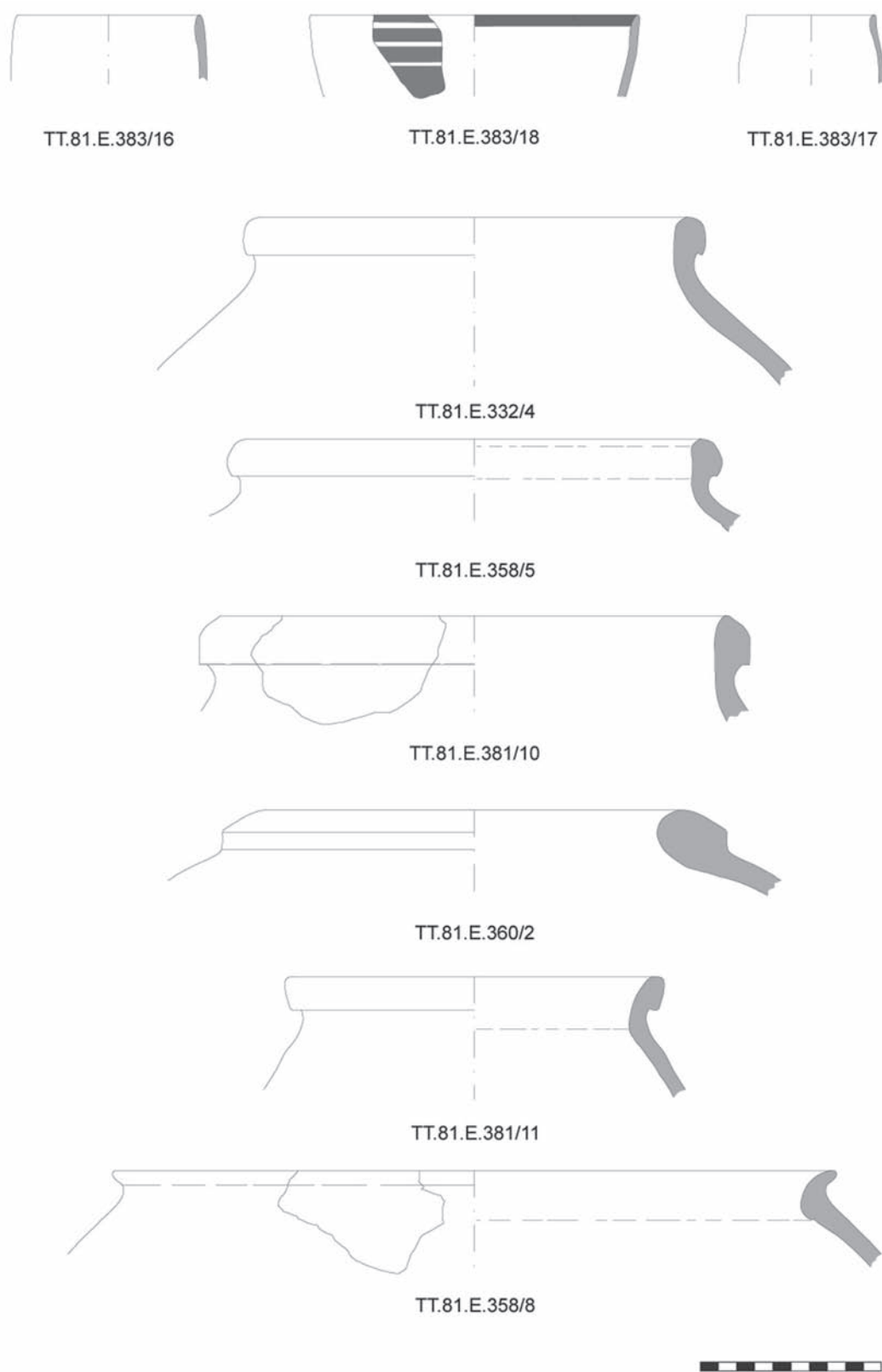


Figure 9.16. Tell Tuqan, Area E, EB IVB pottery from the Inner rampart.

CHAPTER 10

ASSEMBLING THE EVIDENCE

Excavated Sites Dating from the Early Bronze Age in and around the *Chora* of Ebla

E. Ascalone and M. D'Andrea

1. IN AND AROUND THE EBLAITE *CHORA*¹

The *chora* of Ebla has been defined as a large area spanning 3,000 km² and encompassing different neighboring ecozones (see Mantellini, Micale, and Peyronel, in this volume). These are defined as the surroundings of Ebla, including, from west to east, most of the plain stretching east of the Jebel Zawiyeh (Area A), the Matkh depression (Area B), the steppe, the Jebel el-Hass, and the Jebel Shbeyt (Area C).

The areas included into the Eblaite *chora* have been object of several surveys (Liverani 1965; de Maigret 1974; 1978; 1981; Haase 1983; Ciafardoni 1987; 1992; Shaath 1985; 1987–1988; 2011; Boschian 1999–2000; Giannessi 1999–2000; Mazzoni 1999; 1999–2000a; 2005b; 2006b; 2011b; Melis 2005; see also Mantellini, in this volume; Mantellini, Micale, and Peyronel, in this volume). These studies allowed to collect sufficient data to outline the major phases of frequentation and occupation of this region during the third millennium B.C. and to link them to the socioeconomic and political phenomena taking place within each ecozone—especially the spread of the so-called secondary urbanization (see Mazzoni 1991b; 2006a, 325–327; Matthiae 1993b; 2010b, 33–47)—according to the respective potential in terms of topographical position, access to resources, and integration into the major trade routes (see Mantellini, Micale, and Peyronel, in this volume). However,

the number of archaeological sites investigated through soundings or systematic and extensive archaeological excavations is substantially lower, including only five cases (see § 2).

Furthermore, the area outside the Eblaite *chora*, but immediately surrounding it, deserves attention since it shows a close cultural affinity with the *chora* during the mid and late third millennium B.C. This region encompasses areas located at the “periphery” of the *chora*: the Ghab plain and the Ruj basin to the southwest, between the Ebla and the Hama regions, and the area south and east of Aleppo to the northeast, up to the Jabbul plain included (Figure 10.1).

In this article we present a brief review of the main discoveries at archaeological sites included within the Eblaite *chora* in order to define the *status quo* of stratified data for the third millennium B.C., particularly in terms of material culture, so that they can be integrated with the data from the regional surveys. We then propose a synthetic presentation of the main features of the excavated sites in the area encircling the *chora* of Ebla, and finally put forward some considerations on the geographical extension of the cultural and ceramic horizons and their relation with the polities.

2. EXCAVATED ARCHAEOLOGICAL SITES IN THE EBLAITE *CHORA*

Beside Tell Mardikh/Ebla (EC 001; for a general presentation of the results, with relevant

bibliography, see Matthiae 1995a, 66–132, plates 5–73; 2010b, 64–208, 377–99, plates I–XV; see also Matthiae, in this volume) and Tell Tuqan (EC 004; Baffi 2006d; 2008; 2011b; see Baffi and Peyronel, in this volume), excavated sites in the *chora* of Ebla include Tell Afis (EC 002; § 2.1) and Tell Mastuma (EC 096; § 2.2) in the Ebla region; soundings have been carried out also at Tell Deinit, which falls outside the area of investigation of the Ebla Chora Project (hereafter ECP) (see Mantellini, Micale, and Peyronel, in this volume), but which is located within the area of Idlib and has yielded some Early Bronze IV ceramic materials;² finally, a tomb dating to EB IVB has been brought to light at Saraqeb (§ 2.1), south of Tell Afis.

2.1. Tell Afis and the Tomb of Saraqeb

Tell Afis is located ca. 50 km southwest of Aleppo and 11 km northwest of Ebla (Figure 10.1). The site was visited by William F. Albright in 1932 (Albright 1933, 31). Subsequent surveys and soundings were carried out in 1970, 1972, and 1978 by the Sapienza University of Rome under the direction of Paolo Matthiae (Matthiae 1979c), and systematic excavations started in 1986 on behalf of the Universities of Pisa and Bologna, and, subsequently, the University of Florence, under the direction of Stefania Mazzoni and Serena Maria Cecchini (Cecchini 1987; 1993; 1994; 1994–1995; Mazzoni 1991a; 1994b; 1998a; 1998b; 1998c; 1999–2000b; 2002b; 2005a; 2006–2007; 2007; Mazzoni and Cecchini 1995; Cecchini and Mazzoni 1998; Venturi 1997). The site has an ovoid shape covering 25 ha; the Acropolis is located in the northern part of the tell, while the Lower Town is in the southern sector.

A long chronological sequence from the Early Chalcolithic period (Afis I = ca. 5500–3800 B.C.) to the Persian Era (Afis X = ca. 550–330 B.C.) has been identified at Tell Afis. Within this sequence, the EBA occupation is represented by Afis III (EB I–III, ca. 3100–2500 B.C.) and Afis IV (EB IV, ca. 2500–2000 B.C.) phases (Mazzoni 1995, 252; Felli and Merluzzi 2008, 97–98, figs. 1–2, 4–5).

EBA evidences were collected in the excavations carried out in 1991–1992, 1994, and 2001–2004 in Area E, on the western slope of the Acropolis (Mazzoni 2011b, 55). EB IVA materials were collected mainly in secondary contexts (Giannessi 1995, fig. 10:5–6; Mazzoni 1995, 248;³ 1998d, 9, fig. 18:15–18; here Figure 10.4), but no traces of occupation were detected in primary loci. EB IVB occupation was identified in level 17 with two main subphases, 17b and a (Giannessi 1995; Merluzzi 1995; Mazzoni 1995, 247–48).

The earliest occupation, level 17b, is documented in squares CoV3-4, CpV3-4 and CqV6 by the remains of a few walls and a floor (L.1472). The following level 17a (L.1462, L.1464/L.1474,⁴ M.1117) is represented by the remains of a domestic unit composed by three axial rooms with evidence of flint blades productions, such as obsidian and flint blades and flakes, and working places (Merluzzi 1995, 253, fig. 7a; here Figure 10.2). This area kept its domestic function until the latest EB IVB phase, and was bordered to the west by a substantial retaining wall made of mud-bricks (M.1117; *ibidem*, 254), which has been identified also in squares CoV1-2 (Giannessi 1998, 103). In the southern room (L.1464), also a sub-floor jar burial (D.1475) belonging to level 17a has been brought to light. The child's body was laid in a cooking pot—a hole-mouth with inturned swollen rim grooved on the outer surface⁵—and the funerary equipment (Merluzzi 1995, 253–54, figs. 7b, 8; here Figure 10.3) was composed by a simple cup, located near the head of the deceased, and a necklace, known in a single bead. Remains of two other rooms (L.1112, L.1168), also attributed to level 17a, were discovered in squares CoV1-V2 and CpV2 (Giannessi 1998, 103, figs. 11–13).

In square CoIV20, the earliest EB IVB phase, level 17b, was represented by an industrial installation placed in an open courtyard, featuring an oven filled with basalt grinding stones and pestles, a mud-brick platform, a plasterer floor, and a series of rooms to the east and the south of the open space (Giannessi 1995, 256, fig. 12). Further olive pits and a *tannur* associated to a surface made of orange clay and gravel were identified

in square CpV2, and in L.1168, underneath the level 17a structures (Giannessi 1998, 103–4). In squares CoV2 and CpV2 also pits dug into the Late Chalcolithic levels were found, yielding EB IVB ceramic materials dating from an early phase of EB IVA (Giannessi 1995, fig. 9:10; 1998, 104; Mazzoni 1995, 248; 1998d, 9, fig. 18:15–18; here [Figure 10.4:1–4](#)).

In squares CpIV19–18, CoIV20 and CpIV20 level 17a occupation is distinguished by three pits connected by a floor made of packed clay and gravel (L.1456), which was also linked to a plastered room sealed by a layer of collapsed mud-bricks (L.1453). The former yielded two diorite carinated Egyptian bowls (TA.94.E.19 and TA.94.E.139; see Scandone Matthiae 1995; here [Figure 10.5](#)),⁶ while from L.1456 came a storage jar with swollen rim, and another storage jar with everted thickened outside rim (Giannessi 1995, 256, fig. 10:5–6; here [Figure 10.4:5–6](#)). All those material compare well with Mardikh IIB1 at Ebla, but have been attributed to a very early EB IVB horizon, probably shortly after the destruction of Royal Palace G, due to the stratigraphic position of level 17a remains, on top of the EB IVB layers in this area, and based on an overall evaluation of the EB IVB ceramic assemblage from this sector of the site (Mazzoni 1995, 248).

In CoIV20 and CpIV20 level 17a is represented also by a plastered installation (L.1448) with human bones, beads, and vessels (two Syrian Bottles, a painted jug, and a grooved teapot; see Giannessi 1995, 254, fig. 10:1–4, and nos 55–56 for parallels) scattered all around, hinting at the possible presence of a burial (D.1455).

In the 2001–2004 archaeological campaigns the area investigated in 1994 was enlarged, and new structures belonging to a workshop area were brought to light (Felli and Merluzzi 2005; 2008, 98–102, fig. 3; Mazzoni and Felli 2007, 212, fig. 3). These are represented by a large vertical kiln (Furnace A); an adjacent room to the east, probably related to it, with an installation constituted by two vessels embedded in a shard-packed floor; and a central open working space with a cobblestone-paved area (Felli and Merluzzi

2005, fig. 41.1; here [Figure 10.6](#)). Finally, a second kiln (Furnace B) was identified to the south (*ibidem*, fig. 41.2).

The ceramic assemblage of level 17 (Mazzoni 1998a, 32–33, figs. 16:12–18, 17–18, 19:1–15; see also Felli and Merluzzi 2005, 51–52; 2008, 98, figs. 4–5; here [Figure 10.7](#)) includes vessel types and ware classes and productions typical of the EB IVB pottery horizon of northwestern inner Syria (Mazzoni 2002a, 78–79, plates XLIV–XLVV).⁷ The ceramic corpus is homogeneous, mainly made of a grit-tempered high-fired buff fabric, and hints at the existence of mass-produced and standardized ceramics (Mazzoni 1998a, 32). Attested vessel types include Painted Simple Ware goblets in the typical style, painted, combed, and reserved ([Figure 10.7:1–3](#)); everted rim jars ([Figure 10.7:7](#)) and trefoil-mouth jugs ([Figure 10.7:8](#)); Simple Ware goblets, plain ([Figure 10.7:9–11](#)) or with light surface combing ([Figure 10.7:12](#)); double-rim jars with combed decoration ([Figure 10.7:13](#)); bowls with vertical rims ([Figure 10.7:14](#)); bowls with molded ([Figure 10.7:15–16](#)), indented, or grooved rims ([Figure 10.7:17–18](#)); large platters with outward folded rim ([Figure 10.7:19](#)) and plain ledge handles ([Figure 10.7:20](#)) made of Kitchen Ware fabrics; and jars with inner-stepped rim ([Figure 10.7:21](#)). It is noteworthy that Simple Ware goblets ([Figure 10.7:12](#)), jars with combed decoration ([Figure 10.7:13](#)), and bowls with grooved or indented rim ([Figure 10.7:17–18](#)) represent the latest EB IVB ceramic horizon, which has been labelled EB IVB3 within the sequence of Area HH at Tell Mardikh that was brought to light in the 2004–2008 excavation seasons (Matthiae 2007, 507–12, fig. 27; as for Tell Afis see Mazzoni 1998a, 9, fig. 19:1–15).⁸

Finally, a burnished jar with triangular ledge handle on the rim, found in layer 17—which has consistent parallels in EB III assemblages in the Quweiq basin and at Tell Hammam et-Turkman VI in local EB IV—has been regarded by Mazzoni (*ibidem*, 33, with relevant bibliography and parallels) as imported and possibly residual.

As far as small finds are concerned, during the 2000–2001 seasons of excavations at Tell

Afis, three fragments of clay female figurines (TA.00.B.38; TA.01.B.41, and TA.01.B.129; Scandone Matthiae 2002, figs. 8.1, 8.4, 8.5 respectively; here [Figure 10.8](#)) were found in Area B. Parallels from Ebla, Hama, Tell Selenkahiye, and Habuba Kebira (see *ibidem*, 16, with relevant bibliography) allow to date the specimen TA.00.B.38 to the end of the EBA, whereas it is difficult to have a more detailed chronological support for TA.01.B.41 and TA.01.B.129.⁹

Finally, from the stratified deposit of the EBA, 266 specimens of lithic industry were collected, including a large amount of fine and modular local exemplars and sporadic evidence of imported elements (Di Gregorio 2005, 120, figs. 67–68).

Further EB IVB archaeological evidence in the area of Saraqeb was brought to light in 1983, when Abdo Asfari, at that time assistant director in the Idlib Museum, was informed of the casual discovery of a tomb during the excavation of a canalization (Suleiman and Gritsenko 1986). The tomb was cut into the rock and lacked the entrance shaft. The funerary chamber, roughly oval-shaped, was 1.5 m high, 2.5 m long, and 2 m large (*ibidem*, 57, fig. 3). The ceramic assemblage suggests that the tomb contained multiple burials and that it was used repeatedly during EB IVB and Middle Bronze IA. The funerary equipment is constituted by two bronze objects, a bracelet (*ibidem*, fig. 1:25) and a tripartite spearhead with bent tang (*ibidem*, fig. 1:24, plate I:2);¹⁰ a MB IA clay figurine (*ibidem*, plate I:3; Marchetti 2001, 218n321); and a substantial ceramic assemblage with materials dating to both phases of use of the tomb (Suleiman and Gritsenko 1986, figs. 1–3, plate I:1; here [Figure 10.9](#)).

With regard to the EB IVB assemblage, Simple Ware includes bowls with vertical upright, beaded, outward-folded, triangular, molded, and grooved rims (*ibidem*, figs. 1:4–13, 3:7–8; here [Figure 10.10:1–11](#)), spouted jars (*ibidem*, fig. 1:18; here [Figure 10.10:12](#)), trefoil-mouth pitchers (*ibidem*, fig. 2:13; here [Figure 10.10:14](#)), bevelled-rim jars (*ibidem*, fig. 1:23), jars with pointed base (*ibidem*, fig. 1, 20–21; here [Figure 10.10:13](#)), ovoid flat-based jars with double rim

(*ibidem*, fig. 1:19), spherical pots (*ibidem*, fig. 2:10), and two-handled storage jars (*ibidem*, fig. 2:24). Painted Simple Ware vessels are represented by painted goblets (*ibidem*, figs. 1:1–3, 3:1; here [Figure 10.10:16–17](#)), bowls with triangular, outward-folded, or vertical and swollen rims (*ibidem*, fig. 1:14–16; here [Figure 10.10:18](#)), necked jars (*ibidem*, figs. 2:1–3; here [Figure 10.10:21, 24](#)), necked spouted jars (*ibidem*, fig. 1:17; here [Figure 10.10:25](#)), and Syrian Bottles (*ibidem*, fig. 2:4–6; here [Figure 10.10:26–28](#)). Finally a pattern-combed jug (*ibidem*, fig. 2:15; here [Figure 10.10:15](#)) and two grooved and spiral burnished bottles are attested within the tomb assemblage (*ibidem*, fig. 2:11–12; here [Figure 10.10:29–30](#)).

2.2. Tell Mastuma

Tell Mastuma is a tell measuring about 200 m in diameter and 20 m in height. It is located 5 km from the modern city of Idlib, at an elevation of 478 m a.s.l.¹¹ The Japanese archaeological expedition directed by Namio Egami on behalf of the Ancient Orient Museum of Tokio started working at the site in 1980 (Egami 1983; 1988; Egami and Masuda 1984; Egami, Wakita, and Gotoh 1984; Wakita et al. 1994; Wakita et al. 1995; Iwasaki et al. 2009).

At Tell Mastuma fourteen layers of occupation ranging from the EBA (Stratum XIV) to the Iron Age (Stratum I) have been identified. The EBA occupation corresponds to Period A (Strata XIV–VI, about 10 m in thickness, in the North Trench and Layers c–h in the Southern Sounding¹²), contemporary with Hama J and Mardikh IIB1 and IIB2 (Egami, Wakita, and Ishida 1988–1989, 68). The excavations were concentrated mainly in the northern (“North Trench,” squares 9Ha, 9Hb, 9Hc, 9Hd, 10Ha, 10Hb, and 10Hc), central (“Central Area,” squares 11Gb, 11Gd, 11Ha, 11Hc, and 12Ga), and southern sectors of the mound. Later on the first two areas were unified by opening squares 10Gc, 10Gd, 11Ga, 11Gc, 10Hc, 10Hd, 11Hb, 11Hd, 11Ia, and 11Ic (*ibidem*, 53). Finally, in squares 15Gc–16Ga six EBA layers (Layers c–h) were identified, one attributed by the excavators to the earliest phases of the EBA period (Layer h), and five of them

(Layers c–g) dating to EB IVB and represented mainly by a large amount of EB IV ash pits and potsherds. Architectural remains were identified only in Layers e and f (Tsuneki 2009a, 69, 71–74, 75–81, 83–86).

EBA evidence in the North Trench was found in Strata XIII–VIII, which correspond to EB IVA (Strata XIII–X) and EB IVB (Strata IX–VI) (Wakita 2009; Tsuneki 2009a, 86). Finally, though the latest excavations have focused on an investigation of the IA city, identified on the top of the mound, remains attributed to Stratum XI were identified in the North Trench. They consist in a building of two rooms separated by a couple of buttresses, with an entrance to the east and a sort of plastered altar in the inner room (Egami, Wakita, and Ishida 1988–1989, plate 2:1), and in the remains of two sub-floor burials *ibidem*, plate 2:2).

A Red-Black Burnished Ware shard retrieved in Stratum VI (Wakita 2009, 63, fig. 3.7:2) as well as two fragments retrieved in Layer g, and one more in Layer h in square 15Gc (Tsuneki 2009a, 80, fig. 3.23:7), and some ceramic materials found in Layer h (Plain Simple Ware, Incised and Impressed Ware, and Reserved Slip Ware) suggested to the excavators (*ibidem*, 83–86) the existence of a ceramic and chronological horizon antecedent to that corresponding to the Mardikh IIB1 phase at Ebla (Royal Palace G horizon), and possibly matching the Amuq G ceramic horizon. EB IVA materials are represented by corrugated goblets (Wakita 2009, figs. 3.8:4, 3.9:2; here [Figure 10.11:1–5](#)) and grooved-rim jars with scabbled decoration on the shoulder (*ibidem*, fig. 3.9:17; here [Figure 10.11:6](#)), both of which have consistent parallels in the ceramic repertoire of Royal Palace G at Ebla (see Mazzoni, in this volume; D’Andrea and Vacca, in this volume).

Finally, EB IVB materials (Iwasaki et al. 2009, figs. 3.8, 3.9:2, 25–26) include Painted Simple Ware bowls ([Figure 10.11:7–8](#)) and jars ([Figure 10.11:9–10](#)); the typical painted, combed, and reserved goblets ([Figure 10.11:11–13](#)); Simple Ware bowls with grooved rim ([Figure 10.11:17](#)) and with molded ([Figure 10.11:16](#)) and outward-folded rims ([Figure 10.11:18](#)); and Kitchen Ware

platters with ledge handles ([Figure 10.11:19](#)) and large basins ([Figure 10.11:20](#)).

Finally, some artefacts and objects from northern and central areas of the excavations are dated to the EBA, such as clay figurines (Nishiyama 2009, fig. 8.33:3–11; here [Figure 10.12](#)), a bronze pin (Stratum VIII), a bone needle (Stratum XII), and an ivory comb (Stratum XIII) found during the 1986–1988 excavation (Egami, Wakita, and Ishida 1988–1989, fig. 9), together with an unbaked clay portable hearth found on a partially plastered floor belonging to Stratum VII (Nishiyama 2009, fig. 8.34:1; here [Figure 10.13](#)).¹³

3. MAIN EXCAVATED ARCHAEOLOGICAL SITES AROUND THE EBLAITE *CHORA*: A SUMMARY OF THE EVIDENCE

The area directly surrounding the *chora* of Ebla includes some other excavated sites that offer comparisons with the former in several classes of evidence, such as pottery and clay figurines, especially for the mid and late third millennium B.C. (i.e., EB IVA–B). As we have outlined above (§ 1), this region forms a broad ring around the *chora* and includes the area to the south and east of Aleppo that borders on, but does not encompass, the Amuq to the northwest, the Euphrates valley to the northeast, and the regions of Apamea and Hama to the south. The sites included within this region are Ain Hassan, Ansari, Tell Abu Danne, Tell Umm el-Marra, and the Ghab and the Ruj plains where the site of Tell Qarqur has been extensively excavated, while soundings at Tell Aray 1 have brought to light still unpublished EBA ceramic materials and architectural remains.¹⁴

3.1. Ain Hassan

An ancient cemetery, near the village of Ain Hassan, in the northern part of the Jebel el-Hass, about 25 km south-west of Aleppo, has been the object of salvage excavations directed by George Ploix de Rotrou, on behalf of the Archaeological Museum of Aleppo in 1931–1932. Data from the dig in the archives of the Direction General of Antiquities and Museums in Damascus have

been published recently by M. Al-Maqdissi (2006). These include plans of four shaft-tombs (II-IV, XII, XV) among the nineteen originally identified in the necropolis, and funerary equipment of three of them (Hypogea III, IV, XII). Hypogea XII dates from the MB II (Al-Maqdissi 2006, fig. 12), Hypogea III spans the period between EB IVB and MB I, and, finally, Hypogea IV dates from EB IVA only.

Hypogea IV, a trapezoidal chamber with a rectangular entrance-shaft, contained 5 burials (Al-Maqdissi 2006, fig. 3). The ceramic assemblage (*ibidem*, figs. 7–8) includes vessel forms which compare well both with Mardikh IIB1 ceramic horizon and with the corresponding one in the Middle Euphrates valley.¹⁵ Open shapes include plain goblets with pierced lugs (see the corrugated specimen in [Figure 10.4:2](#) for comparison), elongated corrugated goblets with ring base, cups with flat base and flaring walls, both plain and corrugated, bowls with ring base and beaded rim, bowls with ring base and molded rim, which in the Euphrates valley appear in Phase 4 (see Cooper 2006a, fig. 1.5:n). Closed-shape vessels comprise plain trefoil-mouthed jugs, teapots with short and wide neck, both plain and corrugated, globular jars with ring base and tall flaring neck, elongated Syrian Bottles, some of them spiral burnished, Syrian Bottles with pointed base, globular cooking pots with flaring rim, which compare well both with north-western Syria and the Middle Euphrates valley during this period. Beside these ones, vessel forms typical of the Euphrates valley are attested, such as globular necked-jars with elongated spouts (see *ibidem*, 14–15, fig. 1.4:g–h) and globular jars with narrow neck and two loop handles on the shoulder (see *ibidem*, 18, fig. 16:c). The former in the Euphrates valley appear already during Phase 3, while the latter appear during Phase 4, which corresponds to Mardikh IIB1 phase at Ebla.¹⁶

The EB IVB ceramic assemblage from Hypogea III (Al-Maqdissi 2006, figs. 9–11) comprises both vessels shapes typical of Mardikh IIB2 pottery horizon and forms introduced in the Middle Euphrates valley in the corresponding

cultural horizon,¹⁷ together with types remaining in use from the previous one.¹⁸ In fact, corrugated goblets with ring base and elongated shape, bowls with beaded rim and ring base, tall-necked teapots with elongated spouts, and globular jars with ring base and tall neck with outflared-rim are no longer attested at Ebla during the Mardikh IIB2 phase, but remain in use in the Middle Euphrates valley during Phases 5–6. On the other hand, goblets with short pedestal base (see Cooper 2006a, fig. 17:c for comparison), globular jars with tall neck and grooved-rim (see *ibidem*, 18, fig. 1.6:a–b for comparisons) and bowls with collared-rim and ring base (see *ibidem*, 21–22, fig. 1.7:d–f for comparisons) are newly introduced during Phase 5 in the ceramic assemblages of the Middle Euphrates valley. Finally, vessels within the Tomb III assemblage which compare with Mardikh IIB2 phase are above all Painted Simple Ware bowls with thickened rims, bowls with molded rim (see [Figure 10.10:19–20](#) for comparison), small jars (see [Figure 10.10:23](#)), small to medium size necked-jars (see [Figure 10.10:21, 24](#)), and bottles (see [Fig. 10.27–28](#)), Simple Ware trefoil-mouthed jugs (see [Figure 10.10:14](#)), Syrian Bottles both of elongated shape (see [Figure 10.10:29](#) for comparison) and of the type with larger body and pointed base (see [Figure 10.10:30](#) for comparison).

Thus also Ain Hassan shows, for EB IVA and IVB, typological and stylistic features belonging both to the ceramic tradition of northwestern Syria and to the one of the Middle Euphrates valley. This mixed repertoire was probably due to its position at the fringes of both geographic-cultural areas, as noticed also at other sites in the Jebel el-Hass analyzed in the article and located in the north-eastern sector of the “*peri-chora*” area (see § 3.4).

3.2. Ansari

Ansari is located southwest of the modern city of Aleppo. Excavations at the site were carried out by Antoine Suleiman on behalf of the Archaeological Museum of Aleppo in 1973–1980 and brought to light the remains of a settlement dating back to EB IV, the MBA, and the LBA, with traces of Hellenistic and Roman occupation, and of a

tomb used through EB IV and MBA (Suleiman 1983; 1984; Suleiman and Gritsenko 1986, fig. 3; 1987). The scanty remains of EB IV domestic occupation are mainly represented by small stretches of walls, paved courtyards, refuse pits, and storage pits (Suleiman 1984, 4–8). The rock-cut tomb was irregular in shape, 4.4 x 3.2 m, composed by a circular space to the east and an elliptical one to the west connected by a small corridor (Suleiman 1983, fig. 3; 1984, plate I:2). The tomb was employed for multiple successive burials in EB IVA and MB II.

In the periodization of the site, EB IVA and IVB correspond respectively to the phases Ansari VIII and Ansari VII (*ibidem*, 231–32); however, the reports do not include contextual information on the materials belonging to the tomb and to the site, and, except for few vessels (*ibidem*, 3, plates II:2–4, VI–VII) and beads (*ibidem*, 3, plate V:44–49), no information about the original finding spot are provided, therefore it is not possible to divide between materials from the tomb and the settlement.

Ansari VIII/EB IVA assemblage is represented by ring-based corrugated goblets made in pale brown and greenish-gray fabrics in both short (Suleiman 1983, plate I:1, 6; 1984, plate II:1, 5; see [Figure 10.11:2–5](#) for comparisons) and elongated (Suleiman 1983, plate I:2–3, 7; 1984, plate II:2–3, 6) varieties and storage jars with grooved rims (Suleiman 1983, plate I:29–30; 1984, plate IV:27–28; see [Figure 10.11:6](#) for comparisons) and with swollen rims (Suleiman 1983, plate I:31–33; 1984, plate IV:29–31), all typical of the ceramic horizon of Royal Palace G (see Mazzoni, in this volume; for storage jars see also D’Andrea and Vacca, in this volume).

Aril Höyük VII/EB IVB assemblage includes Simple Ware bowls with molded rims (Suleiman 1983, plate I:24–27; 1984, plates III:22, IV:23–25; see [Figures 10.7:15](#), [10.10:6–8](#), [10.11:16](#) for comparisons); Painted Simple Ware bowls with flaring walls and swollen rims (*ibidem*, plate I:18–19; 1984, plate III:17–18; here [Figure 10.10:19–20](#)); small jars with beaded or swollen rims (*ibidem*, plate I:13, 15–16; 1984, plate III:12, 14–15); goblets with swollen or beaded

rims (Suleiman 1983, plate I:10–12; 1984, plate II:9–11; see [Figures 10.7:1–3](#), [10.10:16–17](#) for comparisons) and jars with swollen rims (Suleiman 1983, plate I:17; 1984, plate III:16; here [Figure 10.10:22](#)), both types also combed and reserved; and finally a gray spiral burnished bottle, identical to the specimen found in the tomb of Saraqeb (see § 2.1; see [Figure 10.10:30](#)), is attested (Suleiman 1983, plate II:10; 1984, plate VII:65).

3.3. Tell Abu Danne

Tell Abu Danne, located 25 km east of Aleppo, has been object of excavations by a Belgian archaeological expedition directed by Roland Tefnin in 1975–1983 (Tefnin 1979b; 1980a; 1983). The soundings yielded a long archaeological sequence, including EB I–II, MBA, LBA, IA I–II, and Achaemenid, Hellenistic, and Early Roman periods (Niveaux VII–I: see Tefnin 1980a, 184). EB I–II remains (Niveaux VII) are mainly represented by fillings rich in archaeological materials and some stone walls beneath the MBA casemate fortifications, originally erected during the EB IV period (*ibidem*, 191–193, table VI, figs. 12, 14; 1983, 142, fig. 2). Pottery belonging to these strata is described (*ibidem*, 198–199, figs. 22–23) as closely matching Amuq F–G and Hama K10–5, and as being characterized by the presence of Chaff-Faced Ware, Chaff-Faced Slipped Ware, and Painted Ware (Hama K10–9), and by the absence of Red-Black Burnished Ware. Beside these findings, EB IVB shards (goblets belonging to Ingholt’s Type GIII: see Ingholt 1934, 34, plate XI:1) have been collected on the surface of the tell, hinting at a possible occupation of the site during EB IVB (Tefnin 1980a, 198).

3.4. Tell Umm el-Marra

Tell Umm el-Marra, located at the northern edge of the Jabbul plain and provisionally identified with ancient Tuba (Matthiae 1979b; Catagnoti 1991), has been the object of archeological soundings by the Belgian expedition directed by Tefnin in 1978–1979, which yielded evidence of EBA occupation at the site (periods IV–V; Tefnin 1979a; 1980b; 1981–1982; 1983).

Later the site has been the object of a systematic exploration directed by Hans H. Curvers and Glenn M. Schwartz in 1994–2010 on behalf of the John Hopkins University and the University of Amsterdam (Curvers, Schwartz and Dunham 1997; Schwartz et al. 2000; Schwartz et al. 2003; Schwartz et al. 2006; Schwartz et al. 2012; Schwartz 2007a; Schwartz and Miller 2007, 181–182).

Pre-EB IV structures and materials (Umm el-Marra VI) belonging to domestic occupation have been retrieved on the Acropolis North (Schwartz et al. 2003, 327–29, table 1, fig. 3), and attributed by the excavators to a chronological and ceramic horizon parallel to Amuq H, Qara Quzaq V and Tell Banat Period IV (ibidem, 328; Schwartz 2007a, 513). To the same chronological horizon the excavators have attributed also two of the tombs discovered in the monumental elite mortuary complex on the Acropolis, i.e., Tombs 5, 6 and 8 (Schwartz et al. 2006, 606–609; Schwartz et al. 2012, 160–62). Their ceramic repertoires (Schwartz et al. 2006, 607–609, fig. 5; Schwartz et al. 2012, fig. 5) compare well with those of the Middle Euphrates valley attributed to Phase 3 (see Cooper 2006a, fig. 1.4).

EB IVA (Umm el-Marra V) occupation is represented by both domestic units and monumental buildings, especially the elite funerary complex on the Acropolis, which includes mud-brick tombs on stone foundations, a huge circular stone platform, *favissae*, and animal burials with cultic purpose (Schwartz et al. 2003, 330–41; Schwartz et al. 2006; Schwartz et al. 2012; Schwartz 2007b). To this phase five tombs could be attributed, i.e., Tombs 1–4 and 9–10.¹⁹ The complex yielded basalt miniature tables (Schwartz et al. 2006, fig. 17), gold and silver ornaments and vessels, bronze weapons (Schwartz et al. 2003, figs. 7–11, 14–17, 20–21; Schwartz et al. 2006, figs. 6, 20, 22–24), lapis lazuli amulets (Schwartz et al. 2003, fig. 12), cylinder seals (ibidem, fig. 13), and allegedly inscribed cylinder seals (Schwartz et al. 2006, fig. 25; 2010) and pottery vessels (Schwartz et al. 2006, figs. 5–7). The EB IVA pottery repertoire of Umm el-Marra shows features shared with

northern inner Syria to the west (see Schwartz 2007a, 514), such as the whole range of the typical plain and corrugated grooved teapots (Schwartz et al. 2006, figs. 10:13–14, 16:3–4, 21:1–2; see [Figure 10.11:2–5](#) for comparisons) and goblets of Mardikh IIB1 ceramic horizon (ibidem, figs. 7:9–12, 16:7–14, 21:12, 14), some of them in the elongated variety typical of the Euphrates valley (Schwartz et al. 2003, fig. 23:7–8; Schwartz et al. 2006, fig. 21:13, 15–16). Other elements point to a stronger link with the Middle Euphrates valley, such as “champagne cups” (Schwartz et al. 2006, fig. 5:1), spiral burnished Euphrates Banded Ware bowls with pedestal base (ibidem fig. 10:15, 19), jars (ibidem fig. 10:16–18), and Syrian Bottles (Schwartz et al. 2003, fig. 23:11–12; Schwartz et al. 2006, figs. 16: 6, 21:3–5), and painted Euphrates Banded Ware chalices and jars (Schwartz et al. 2006, 610, 614, fig. 11:7–9).²⁰ Finally bowls with beaded rims, tripod or with ring base (ibidem, figs. 10:4–5, 8, 21:9), are a vessel type which originates in the Euphrates valley, but which spread also over northern inner Syria during EB IVA.

Tomb 7 and the last use of the Acropolis Center mortuary complex have been assigned to early EB IVB (Schwartz et al. 2012, 163, 167, fig. 9). Finally, EB IVB (Umm el-Marra IV) materials found on the Acropolis East and belonging to a residential quarter (Schwartz et al. 2000, 423, fig. 3) include the typical Painted Simple Ware goblets (ibidem, fig. 4:2–3; see [Figures 10.7:1–3](#), [10.10:16–17](#), and [10.11:12](#) for comparisons), bowls with molded rim (Ibid., fig. 4:8; see [Figures 10.7:15](#), [10.10:7–8](#), [10.11:16](#) for comparisons), and Kitchen Ware trays with pitted bottom and Smeared Wash Ware shards known from Hama J5–1 and Mardikh IIB2 (Schwartz et al. 2003, 329; Schwartz 2007b, 515).

3.5. Tell Qarqur

Tell Qarqur, immediately west of the Jebel Zawiyeh and identified with Karqara/Qarqar of the Neo-Assyrian texts (Pritchard 1955, 278–279, 285, 287; Dornemann 2003, 3), has been investigated on behalf of the American Schools of Oriental Research (hereafter ASOR) by John Lundquist in 1983–1984 (Lundquist

1993) and subsequently in 1993–2002 and 2004 under the direction of Rudolph H. Dornemann (Dornemann 2003; 2008a; 2008b; 2008c; 2008d). Works at the site were resumed in 2005, 2007, and 2008 on behalf of the ASOR and the University of Arkansas, under the direction of Rudolph H. Dornemann and Jesse Casana (Dornemann and Casana 2008a; 2008b; Dornemann, Casana, and Maxwell 2008). The site has yielded a long stratigraphic sequence, ranging from the Neolithic to the Mameluk periods, within which the EBA is represented by Strata 17–12, from EB I to late EB IVB (Dornemann 2003, 10; 2008a, fig. 2; 2008d, 81–84; on the earliest phases see also Dornemann 2012, 230). EB IVA is represented by Stratum 14 and EB IVB by Strata 13–12.

EB II–III (Strata 16–15) materials (among which also Reserved Slip Ware and Red-Black Burnished Ware: see Dornemann 2003, 105–116, figs. 210–212; 2012, 230; Dornemann and Casana 2008b, 124) have been retrieved both in constructional fills dating to the IA and in stratified contexts in Area A, on the south-central slope of the site (Dornemann 2008b, 28, fig. 14).²¹ Here part of a building dating to EB IVA (Stratum 14; a wall, several successive floors, and mud-brick columns) was brought to light, together with pottery shards belonging to the very same ceramic horizon as Palace G of Ebla, including large amounts of corrugated vessels (Dornemann 2003, 87–88; 2008a, 82–83, figs. 2:27–37, 3–4, 5:1–17; 2008c, 50, figs. 29–30; 2008d, 73, figs. 23–26; 2012, 222–23; Dornemann and Casana 2008a, 102, figs. 8–9; see [Figure 10.11:4–5](#) for comparisons). In Area A also a building dating to EB IVB (Stratum 13–12) with several architectural phases (Dornemann 2003, 73–87; 2008b, 28–29, figs. 19–24; 2008d, 81–82, 84, figs. 1, 2:1–26, 5:18–32, 6, 7:1–11) has been excavated, and has yielded Painted Simple Ware goblets and spouted jars in the classical shapes of Hama J 4–1 and Mardikh IIB2 (Dornemann 2003, figs. 145–146; see [Figure 10.10:16](#), 25 for comparisons).²² EB IVB structures and materials have been found also in Area E, opposite from Area A, on top of the northern edge of the site. Part of a substantial building with different

architectural phases, possibly belonging to a single chronological horizon within EB IVB (as suggested by the ceramic material), has been brought to light here, and a cultic function has been provisionally proposed for this place (Dornemann 2003, fig. 98; 2008a, 93–94, figs. 9–12; 2008b, 28–29, figs. 18–20; 2008d, 72–73, figs. 13–16, 18, 21; 2012, 223–28; Dornemann and Casana 2008a, 102, figs. 10–11; 2008b, 123–24; Dornemann, Casana, and Maxwell 2008, 144–45), also due to the presence of a room with five pillars and the retrieval of obelisks and altars (Dornemann 2003, 100, fig. 185; 2008a, 92, figs. 1–3; 2012, fig. 5) as well as precious materials. The destruction layer of the building has yielded a rich assemblage of archaeological materials, including crucibles (Dornemann 2003, figs. 169–70) and bronze and golden items (Dornemann 2003; 2008b, 28, figs. 21–22); remarkable is the retrieval of an axe of the anchor type²³ (Dornemann 2003, 101, fig. 190; 2008a, 28, fig. 21; 2012, 223, fig. 6), laid beneath a painted goblet (Dornemann 2003, fig. 189), and a cache of four bronze weapons (three poker-butt javelin heads and a dagger: Dornemann 2008d, 73, figs. 19–20). Further findings include fragments of inlays and incised lapis lazuli (Dornemann 2003, figs. 171–72, 176–77), a cylinder seal dating to the Akkadian period (*ibidem*, 95, fig. 180; 2012, 225, fig. 15), a clay figurine (Dornemann 2003, figs. 174–75; 2012, 223, fig. 8), and pottery vessels (Dornemann 2003, figs. 178–79, 2012, fig. 14a–b). The latter are represented mainly by Painted Simple Ware goblets with bell-shaped base (see [Figures 10.7:1–6](#), [10.10:16–17](#), [10.11:14](#) for comparisons) and trefoil-mouth painted pitchers (see [Figure 10.7:8](#) for comparison), together with incense burners and four-spouted lamps (Dornemann 2003, fig. 167; 2012, figs. 7, 11–12). A further EB IVB sequence, likely to represent domestic occupation and extended, according to the excavators, to a very late EB IV phase (see n22 below), possibly transitional to MBA, has been brought to light in Area D, in the lower town west (Dornemann 2012, 228–30).

Dornemann (2003, 102, figs. 195–97; 2012) reports the retrieval of three seals impressions

in Area A and two in Area D, within EB IVB contexts, placed on jars in Kitchen Ware fabric belonging to the corrugated type analyzed by Mazzoni (1992) within the Royal Palace G assemblage, and there dating to the EB IVA period.

4. SETTLEMENTS AND MATERIAL CULTURE PATTERNS DURING THE LATE THIRD MILLENNIUM B.C.: SOME HINTS FOR FUTURE RESEARCH

Based on this brief review of the excavated evidence from the *chora* of Ebla, integrated with data collected from the surface surveys (see Mantellini, Micale, and Peyronel, in this volume), some considerations can be advanced concerning both the nature and diachronic distribution of settlements during the third millennium B.C. and the extension of the ceramic horizons within at least part of this time span (as suggested by crossing the data with those obtained from the extra-*chora* sites concisely presented in § 3).

As far as the first point is concerned, some factors affect a diachronic reconstruction of the nature and distribution of settlements, first of all the overrepresentation of surveyed sites compared to excavated ones. Furthermore, the presence of an EBA occupation in sites that have yielded only post-EBA materials from surface collection may be concealed by the absence of a stratigraphic control through soundings. Finally, also for those sites that show multi-phase EBA occupation based on the surface findings, the possibility to reconstruct patterns of continuity or change in both the nature and layout of the settlements between the different phases remains opaque.

On the one hand, data for the earliest phases of the third millennium B.C. are still too scanty to draw a regional picture and propose an in-depth reconstruction of the very first steps of northern inner Syria into the so-called secondary urbanization, which we mostly see as already accomplished in the archaeological record of the main mounds. On the other hand, however, a much substantial dataset for the second half of the third millennium B.C., that is EB IVA-B, allows

us to outline some patterns of development for this period and some changes in the nature of several settlements between the two phases.

The expansion of settlements within Areas A and B of the *chora* (the Ebla region and the Matkh depression), as well as the foundation during the second half of the third millennium B.C. of sites in Area C (the steppe) characterized by less favorable conditions but close to important routes, is certainly linked to the process of urbanization and early state formation in the region, and to the consequent exploitation of a broader range of resources (Mazzoni 2006a, 326; see Mantellini, Micale, and Peyronel, in this volume).²⁴ Yet, EB III is a formative phase showing significant complexity and needs further investigation to be described in its fundamental features.

During EB IVA, Tell Mardikh/Ebla, ca. 60 ha in extension, was the main center in the region that we have defined as the Eblaite *chora* and exerted direct political and socioeconomic control on a wide territory extending from the Jebel Zawiyeh to the west up to the steppic fringes to the east.²⁵ On the other hand, the evidence for EB IVB suggests that some changes occurred in the settlement matrix of the region after the Akkadian destructions at the close of the twenty-fourth century B.C.

The discoveries of the 2004–2009 campaigns at Tell Mardikh/Ebla (Matthiae 2006a; 2006b; 2007; 2009d; 2010b; see also Matthiae, in this volume) have clearly shown that, despite the violent destruction at the end of the Mardikh IIB1 phase, the settlement was reconstructed maintaining an urban status (Matthiae 2010b, 195–204),²⁶ but it is difficult to assume—also on the basis of some indirect textual evidence²⁷—that the site regained the leading role it had in EB IVA (*ibidem*, 190–95). In fact, long-distance trade between Ebla and southern Mesopotamia is attested by Ur III texts from Drehem dating to the mid twenty-first century B.C. that mention messengers and merchants from Ebla bringing precious furniture and luxurious textiles to the courts of Shulgi, Amar-Sin, and Shu-Sin, hinting at a recovered cultural, political, and economic prestige of Ebla at the close of the millennium

(Kärki 1987, 130–31; Heimpele 1987, 79; Frayne 1997, 300–301n2; Owen and Veenker 1987, 266–267, 275; 1992, 118–22; Pinnock 2004, 89–91; Matthiae 2010b, 204).²⁸ It remains to be established if this period in the history of Ebla is to be equated with the end of the Mardikh IIB2 phase (EB IVB3, tentatively 2100–2000 B.C.) or with a later period.²⁹ On the other hand, the weakened power of Ebla over the region during EB IVB1-2 (ca. 2300–2100 B.C.) might have favored the growth and coexistence of more than one major site, though smaller than EB IVA Ebla, thus hinting at a possible change in the settlement matrix of the region between EB IVA and EB IVB, as also the spread of the settlements during EB IVB seems to suggest. It is, in fact, during this phase that Tell Tuqan also developed into a 25 ha site, becoming the main subregional center in the Matkh, and EB IVB is the first EB IV phase well attested also at Tell Afis by substantial evidence.³⁰

Turning to the analysis of ceramic data, some observations can be put forward, particularly with regard to the geographical distribution of ceramic horizons in relation to the polities. Also in this case, as for the settlement patterns, it is difficult to portray a pre-EB IV picture at a regional scale due to a very limited sample of materials, especially from stratified contexts, covering the earliest phases of the EBA, for which our knowledge still relies much on evidence from the Amuq plain (Braidwood and Braidwood 1960) and Hama (Fugmann 1958). In fact, Late Chalcolithic and EB I ceramic materials have been retrieved at Tell Afis, which Mazzoni (1998a, 11–30; 2002a, 13–14) has assigned to a transitional phase melting post-Uruk features and a continuation of local traditions. Scanty evidence of EB II materials comes, in the *chora*, only from Tell Mardikh, and mainly from secondary deposits (ibidem, 73). Finally, EB III ceramics are well documented at Tell Tuqan (see Baffi and Peyronel, in this volume) and possibly Tell Mastuma (see § 2.2), and have been found also at Tell Mardikh, where Buildings G2 and G5 and other structures in Area CC, belonging to this phase, are situated (Matthiae 1987, 136–138, fig. 1; 2000, 572–578).³¹ Finally, in the

area surrounding the *chora* and beyond, some additional materials come from Tell Qarqur, in the Ghab, and from Qalat al-Mudiq in the Quweiq basin (Collon, Otte, and Otte 1975, 155–58).

EB IV, and especially EB IVB, is much better documented by a number of stratified assemblages. As for this period, if the definition of a Eblaite *chora* certainly marks the existence of an area directly controlled, in sociopolitical terms, by the site of Ebla and bounded to it in socioeconomic terms, the spatial distribution of ceramic types and styles allows us to trace a more articulated picture. In fact, sites situated northwest of Hama, such as Tell Khan Sheikhun (du Mesnil du Buisson 1932, 173–74, 177–78, plate XXXVI), Tell As (ibidem, 185–88, plates XXXIX–XLI), Tell Asharneh and surrounding area (Cooper 2006b, 147–52, figs 12:3–13, 18–19, 22; 2007), Tell Masin (du Mesnil du Buisson 1935b, 123–27, plates XLIX–L), as well as several archaeological sites in the region of Hama and Tell Mishrife-Qatna, such as Dnebi, Selimiye, Shairat (du Mesnil du Buisson 1930, 160–63, plates XXXII–XXXIV). Finally, Hama (Ingholt 1934, 29–49, plates VIII–XV; Fugmann 1958, 49–85) and Tell Mishrife (du Mesnil du Buisson 1930, 157–58; Da Ros and Iamoni 2003, 177–78, fig. 1; Besana, Da Ros, and Iamoni 2008, 80–83, figs. 1:8–19, 2–3) have themselves yielded, as well known, ceramic assemblages dating to EB IVA and IVB³² analogous to those of Mardikh IIB1 and IIB2 (Mazzoni 1985b, 563–65; Matthiae 2007, 507–12, figs. 25–27).

Thus, on the one hand the existence of a ceramic horizon encompassing a much larger area than the Eblaite *chora* seems to emerge for EB IV, and to become ever more homogeneous during EB IVB. This horizon extends over the whole northwestern inner Syria, up to the Hama region and the Orontes valley to the south, the Amuq plain to the northwest, and Munbatah and Selenkhayye to the northeast (Kühne 1976; Mazzoni 1985a; 1985b, 562–70; 2000b, 143–44; 2002a),³³ thus reaching beyond the boundaries of the polity of Ebla. On the other hand, within this unitary ceramic province, some areas acting

as “buffers” can be distinguished due to the presence of “mixed” pottery repertoires, a role certainly favored by their geographical position at important crossroads or along trade routes. An outstanding example of such an assemblage is that of Tell Nebi Mend-Qadesh, in the Middle Orontes valley, close to the so-called Homs Gap, which features for the EB IVB phase a ceramic repertoire including vessel types identical to those of Mardikh IIB2 and Hama J4–1 (Mathias 2000, fig. 23.6:98, 105–13) and other vessel types more similar to those of southern Syria (ibidem, figs. 23.5:86–94, 23.6:100). A further northeastern example within the sites investigated by the ECP could be Tell Munbatah, which together with ceramic types of the northwestern inner Syrian repertoire features peculiar types and points to a link with the Euphrates valley (de Maigret 1974, 264–66; see also Mantellini, Micale, and Peyronel, in this volume), an area to which the site certainly gave access from the *chora*. As for the sites included within this contribution but falling outside the Eblaite *chora*, also Tell Umm el-Marra, in the Jabbul plain, features the same “mixed” ceramic repertoire, with pottery types and styles typical of the Ebla and Hama regions as well as the Euphrates valley (Mazzoni 1985b, 569; Schwartz 2007a, 515; Schwartz and Miller 2007, 179; see § 3.4). Finally, a similar model of ceramic distribution can be singled out at Al-Rawda, in the steppes about 50 km northeast of Selimiye, which features both Painted Simple Ware and Simple Ware goblets realized in the northwestern inner Syrian tradition with other, more eclectic, features (Boudier 2007).

This issue certainly needs further investigations and, above all, confirmation through petrographic analysis, in progress within the ECP (see Santarelli, in this volume). These data will need to be crossed with those from other regional areas to infer socioeconomic information concerning the patterns of material culture, which are otherwise unexpressed. That notwithstanding, these data provisionally suggest that cultural and political boundaries did not necessarily coincide, that modes of ceramic exchange during the late third millennium B.C. were articulated and dynamic, and that integration into given exchange routes

strongly affected both the formation of single-site ceramic assemblages and the regional patterns of distribution of ceramic types and styles.³⁴

NOTES

- 1 §§ 1, 3, and 4 have been written by M. D’Andrea, § 2 has been written by E. Ascalone. References to absolute chronologies throughout this article are conventional for dates prior to the first millennium B.C.
- 2 The site, located 6 km southeast of Idlib, has yielded mainly materials and structures dating to later periods (Iron Age, Persian, Hellenistic, Byzantine, and Mamluk periods and Deinit V–I phases; see Shaath 1981–1982; 1985; 1987–1988; 1990; 2007; 2011; Rossi 2011b); yet, also earlier materials have been found. Lithics belonging to the Neolithic period have been retrieved at the northern foot of the site, and a stamp seal dating to the fourth millennium B.C. has been found out of context within the latest stratum. The step trench in Area F has yielded some Middle Bronze Age ceramics and clay figurines (Shaath 1990, plate 10; Marchetti 2007, 218–219, Pl. CCLXIII:1–6; Rossi 2007). Finally, EB IV pottery has been retrieved in Area E, in strata under the remains of a Byzantine church (Shaath 2011).
- 3 Mazzoni (1995, 248) has assigned ceramic materials retrieved in the pits cutting the late Chalcolithic level in squares CoIV20 to the very first phase of the EB IV period, her EB IVA1 (Mazzoni 1991b; 2002a, 76; see also Dolce 2008b), which precedes Palace G of Ebla, and the diorite bowls from Tell Afis to a chronological horizon immediately following the destruction of the Palace, suggesting that no materials corresponding to Mardikh IIB1 Phase have yet been identified at the site.
- 4 The two locus numbers belong to floors of different subphases, levels 17a1 and 17a2, within the same room (Merluzzi 1995, 253).
- 5 For typological comparisons, see Merluzzi (1995, 254n47). See also Mazzoni (1982, 176, fig. XXVI:7) and Fugmann (1958, fig. 64, 3K266 [J6], fig. 74, 3H150 [J5], fig. 103, 3K259 [J1]).
- 6 For historical discussion and comparisons, see Scandone Matthiae (1995, 257). For the diorite bowls found at Ebla, see Scandone Matthiae 1981, 100–103, figs. 21–24, C, D:Aa8.
- 7 Some sherds from the earliest levels belong to corrugated goblets (Felli and Merluzzi 2008, 98,

- fig. 4:1–5). They might be residual as other EB IVA materials from Tell Afis retrieved in secondary contexts, or have a chronological meaning as indicators of an early EB IVB phase.
- 8 Felli and Merluzzi have suggested also the possible existence of a transitional EB-MB horizon at Tell Afis. They singled out the presence of some vessel types—like the carinated bowls with inturned beaded rim found at contemporary eastern sites (*ibidem*, 98, fig. 5:9). On this issue see also the contribution of Mazzoni and Felli (2007, 209–18).
 - 9 For parallels see Scandone Matthiae (2002, 16–17).
 - 10 See Philip (1989, 70–71, 312–14, fig. 10, type 2).
 - 11 An EBA occupation has been identified by the Japanese expedition at Tell Aray 1, where soundings were carried out in 1990–1992 in the framework of the archaeological investigation of the Ruj basin undertaken by the mission directed by Takuya Iwasaki on behalf of the University of Tsukuba. Among the twenty-five layers singled out in the step-trench on the eastern slope of the tell, layers 8–1 represent EBA occupation. Layer 8 features a 1.5 m wide foundation wall running north to south and a ditch associated to the structure, and according to the excavators could represent part of a fortification system. Yet materials and structures are still unpublished (information accessed at the Rouj Basin Project homepage: <http://www.sakura.cc.tsukuba.ac.jp/~elrouj/rouj/Aray/aray1.html>). Furthermore, the exploration of the Idlib district has allowed to identify the following EBA sites: Tell Ain, Tell Awlad Khalil, Tell Nwaz, and Tell Bereraad (Egami and Masuda 1984, 123–24). In the surroundings of Tell Mastuma, tell sites with possible EBA occupation are Tell Kurin, Tell Kafar Najid, Tell Rumman, Tell Babi, Tell Ariha, Tell Jarnaz, Tell Bet Sofan, Tell Mnabiya, Tell Tar, Tell Deinit (see note 2), Tell esh-Shela, Tell Msaibin, and Tell en-Neirab (Tsuneki 2009b).
 - 12 Strata XIII–X in the North Trench have been attributed to EB IVA, Strata IX–VI to EB IVB; no EB IVA has been detected in the South Sounding, where Layers c–h all belong to EB IVB, thus matching Strata IX–VI in the North Trench (Wakita 2009, 57).
 - 13 In level XII thick stone walls suggested the presence of a large building; no more information was collected (Egami, Wakita, and Ishida 1988–1989, 48).
 - 14 See note 11. In this area, ceramic materials dating to EB IVB have been collected from surface at Tell el-Kerkh by Courtois (1973, 90, figs. 25: lower picture, fourth row, 26: upper picture).
 - 15 In the chronological and ceramic sequence recently proposed by Cooper (2006a, 6–26), according to Porter's sequence at Tell Banat (Porter 2007), it corresponds to Phase 4 (Cooper 2006a, 15–20, figs. 1.5–1.6).
 - 16 Cooper 2006a, 12–20. See note 15.
 - 17 Cooper's Phase 5 (Cooper 2006a, 20–23, fig. 1.7).
 - 18 Cooper's Phase 4 (Cooper 2006a, 15–20, figs. 1.5–1.6). Tomb IV ceramic assemblage compare well with Tell Umm el-Marra Tomb 1, which shows a typical Phase 4 assemblage – bowls with ring base with beaded and molded rims (Schwartz et al. 2003, fig. 23:1–3), grooved goblets with elongated shape and ring base (*ibidem*, fig. 23:7–8), flat-based cups with flaring walls, plain or corrugated (*ibidem* 2003, fig. 23:4–5), spouted teapot with ring base and short wide neck (*ibidem*, fig. 23:15), gray and spiral burnished elongated Syrian bottles (*ibidem*, fig. 23:11–12), the globular jars with ring base and grooved rim (*ibidem*, fig. 23:13–14) – together with a plain goblet with ring base comparable to Phase 5 specimens (*ibidem*, fig. 23:6), and Painted Simple Ware jars and bottles (*ibidem*, fig. 23, 9–10) in the EB IVB north-western tradition, but lacks the “collared” bowls of Phase 5. This mixed repertoire led the excavators to assign this tomb to the transition between EB IVA and IVB (*ibidem*, 336).
 - 19 Tomb 3 is the earliest in the sequence, and has been dated to the beginning of EB IVA (Schwartz et al. 2006, 610); tombs 9 and 10 are assigned to early EB IVA (Schwartz et al. 2012, 163). In Tomb 4 two different burial layers were identified, lower and upper, respectively assigned to the early-mid EB IVA, and to the mid-late EB IVA (*ibidem*, 614, 623). Tomb 1 has been attributed to the very end of EB IVA (Schwartz et al. 2003, 336; Schwartz 2007a, 514). Noteworthy, Tomb 1 assemblage includes a jar with thickened rim and large body with pointed base (Schwartz et al. 2003, fig. 24:1), which has close parallels in Mardikh IIB1 ceramic horizon (Schwartz 2007a, 514).
 - 20 With respect to the definition of such production and the relevant terminological issue, see Cooper 2006a, 12, 16.
 - 21 Additional EB I–III and EB IVB materials have been collected in Area D, in the northern sector of the site, and are at present unpublished (Dornemann and Casana 2008a, 104; 2008b, 123).

- 22 Here materials have been divided by Dornemann into two different EB IVB sub-phases: Stratum 13, earlier (Dornemann 2008a, 81–82, figs. 1, 2:1–26), and Stratum 12, belonging to the latest phase of EB IVB (ibidem, 84, figs. 5:18–32, 6), an attribution which seems supported by the substantial presence of multiple grooved-rim bowls and goblets with molded bases in Stratum 12. This phase in Area A corresponds to the destruction layer of the EB IVB building found in squares A26/29 and to the building interpreted as a temple in Area E, Squares E1/3/4/14 (Dornemann 2010, 140–42). Note that, in the most recent summary report, Dornemann has adopted a tripartite sub-phasing for EB IV, according to which the very last EB IV phase at the site is named EB IVC (Dornemann 2012, 221, 229–30).
- 23 See Philip (1989, 65–67, type 2).
- 24 With regard to the topic of urbanization in the steppic fringes and its links with the growth of emergent territorial states see also Castel and Peltenburg (2007), in particular, dealing with Ebla, see pp. 613–14.
- 25 On the possible extension of the socio-politic control of Ebla and particularly the relationships of Ebla with the Euphrates valley see also the recent analyses of Cooper (2010) and Porter (2010).
- 26 With regard to the topographical layout of the EB IVB Ebla see also the considerations of Dolce (1999, 266–69; 2001; 2002), Pinnock (2004, 94) and Mazzoni and Felli (2007, 205–8).
- 27 Matthiae (2010b, 192–94) has put forward the hypothesis that within much of EB IVB the cities of Armanum first, and Urshum later, could have taken control over at least part of the territory formerly controlled by Ebla. This hypothesis is advanced on the basis of some textual evidence, such as Naram-Sin's inscription citing only the king of Armanum and not the king of Ebla, and Gudea's inscription mentioning precious stuff from "the land of Ebla and Urshum" for the construction of the Eninnu (ibidem, 193–94 with relevant bibliography).
- 28 On the relation between Ebla and Ur see the analysis of Pinnock (2006a), dealing with aspects of trade, art, and architecture. With regard to the latter aspect see also the analysis of Matthiae (2002; 2006a).
- 29 With regard to the chronological issue see also the considerations of Pruss (2007), Schwartz (2012, 259–260), Mazzoni and Felli (2007, 208–9), and the analysis and the comparative table by N. Marchetti (2005b).
- 30 On the dynamics of the late third millennium B.C. in north-western Syria see also the analysis of Schwartz (2007c, 49–52, 59).
- 31 With regard to the archaeological evidence for the EB III period at Ebla, see also Dolce 2008b, 2009.
- 32 Tell As assemblage features only EB IVA pottery; Dnebi, Khan Sheikhun, and Selimiye have yielded only EB IVB pottery; the ceramic materials attributed to Zalaqiyate date from the EB IVB only as well (Al-Maqdissi 1987, 291, figs. 1–3); finally, Tell Masin, Tell Mishrife, and Hama assemblages include both EB IVA and IVB materials and Tell Asharneh has yielded EB IV pottery as well as possibly earlier materials.
- 33 The distribution of ceramic regions in Syria during the third millennium B.C. has been analyzed also by Thissen (1989), Jamieson (1993), Carter and Parker (1995), Rova (1996), and Milano and Rova (2000) (see also Mazzoni, in this volume). See also the recent diachronic overview of evidence by Sala (2012, 77–79).
- 34 On the study of pottery and the factors affecting the formation of local and regional assemblages see the considerations of Philip and Baird (2000). On the relation between emerging political control over craft productions and the distribution of ceramic types and styles in EB IV Syria see Mazzoni (1985a, 10–11; 1985b, 571; 2000, 143–144; 2003; see also Mazzoni, in this volume). Carter and Parker (1995), on the other hand, maintain that economic and technical factors, rather than socio-political phenomena, impacted on patterns of ceramic distribution in Syria during the third millennium B.C.

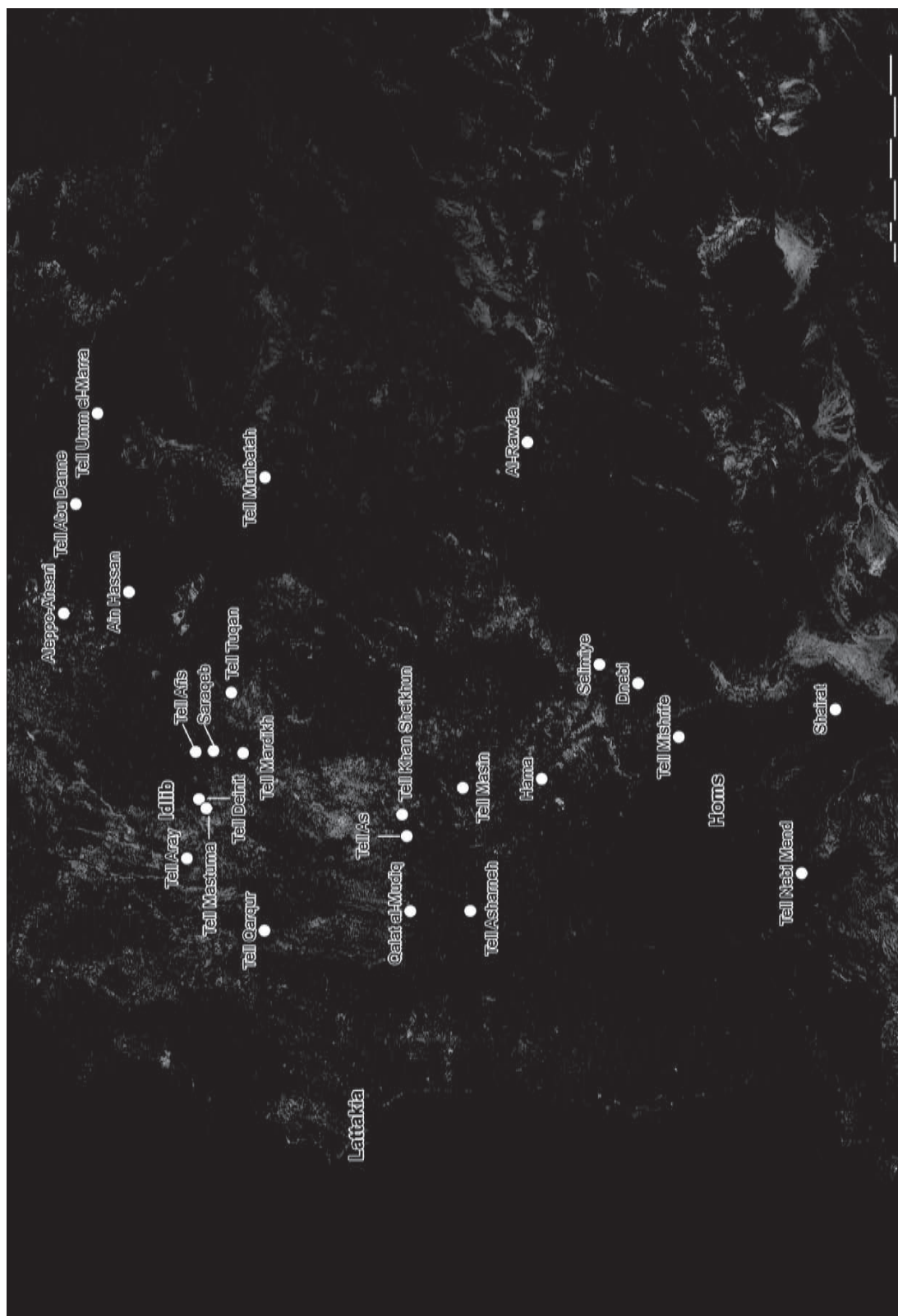


Figure 10.1. Map of sites mentioned in the text (elaboration by S. Mantellini; in the background a LANDSAT TM satellite image).



Figure 10.2. Tell Afis, Area E, EB IV occupation (after Merluzzi 1995, fig. 7a).



Figure 10.3. Tell Afis, Area E, infant jar-burial D.1476, EB IVB (after Merluzzi 1995, fig. 7b).

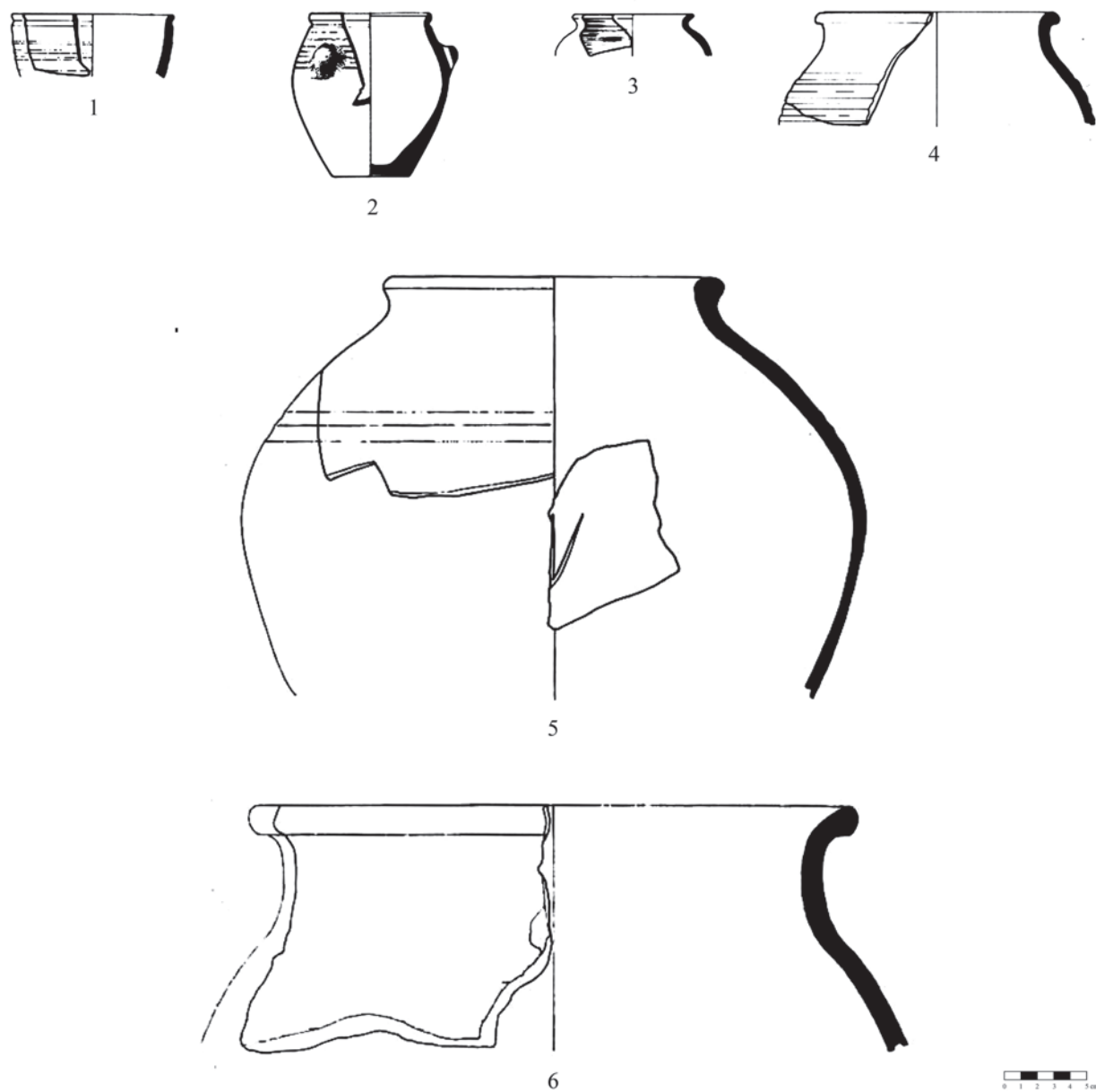


Figure 10.4. Tell Afis, EB IVA ceramic materials from secondary contexts (nos. 1–4 after Mazzoni 1998a, fig. 15:15–18) and materials from Area E attributed to an early EB IVB phase (nos. 5–6, after Giannessi 1995, fig. 10:5–6).



Figure 10.5. Tell Afis, fragments of two diorite carinated bowls, TA.94.E.19 (left), and TA.94.E.139 (right) (after Scandone Matthiae 1995: fig. 13).



Figure 10.6. Tell Afis, Area E, furnace A, EB IVB (after Felli and Merluzzi 2005, fig. 38).

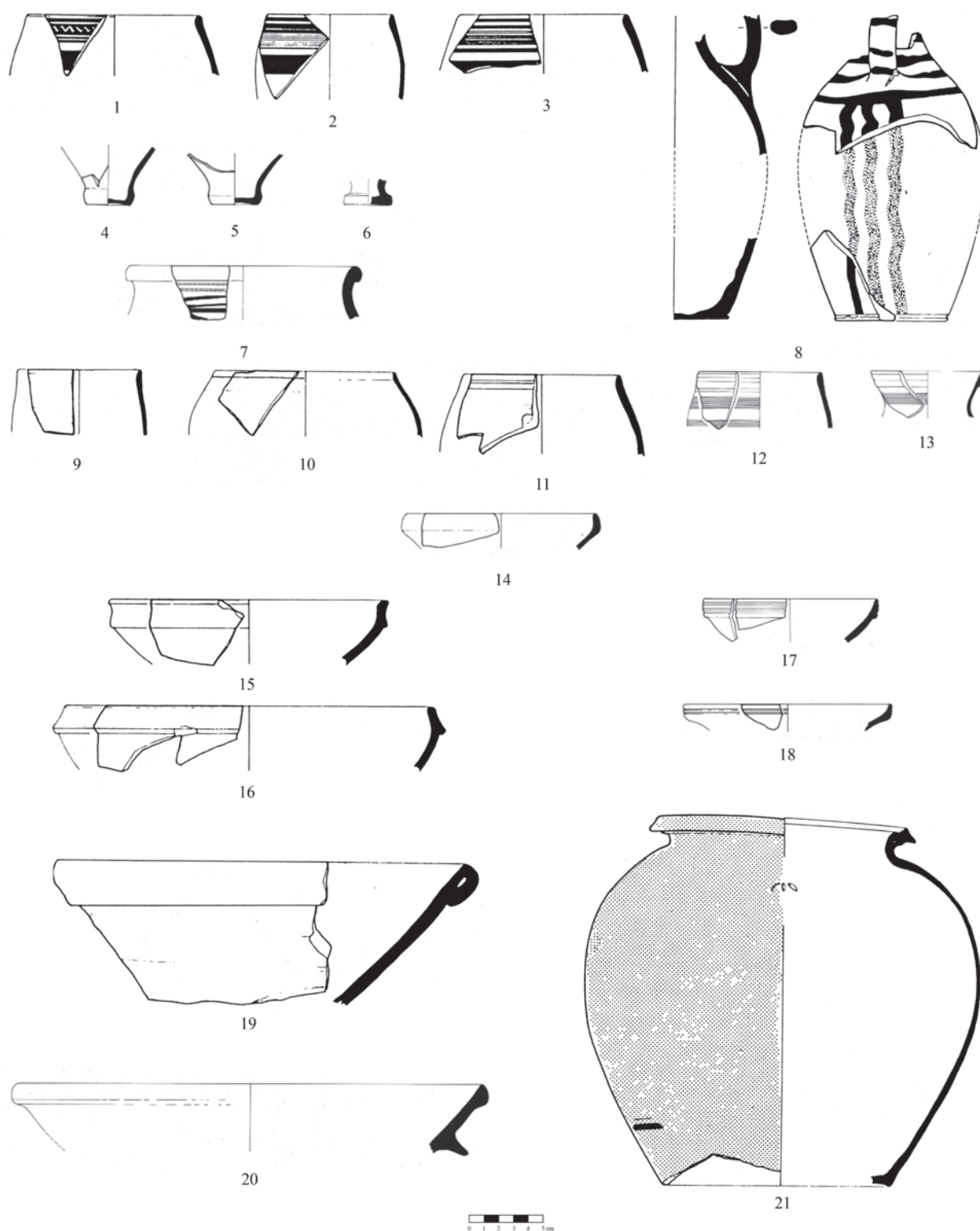


Figure 10.7. Tell Afis, selected EB IVB ceramic materials (Merluzzi 1995, figs. 9:1, 5–9, 13–14, 18–19; Giannessi 1995, fig. 10:1; Mazzoni 1998a, figs. 16:15, 19, 18:5–6, 10, 12–13, 19:1, 5, 13).

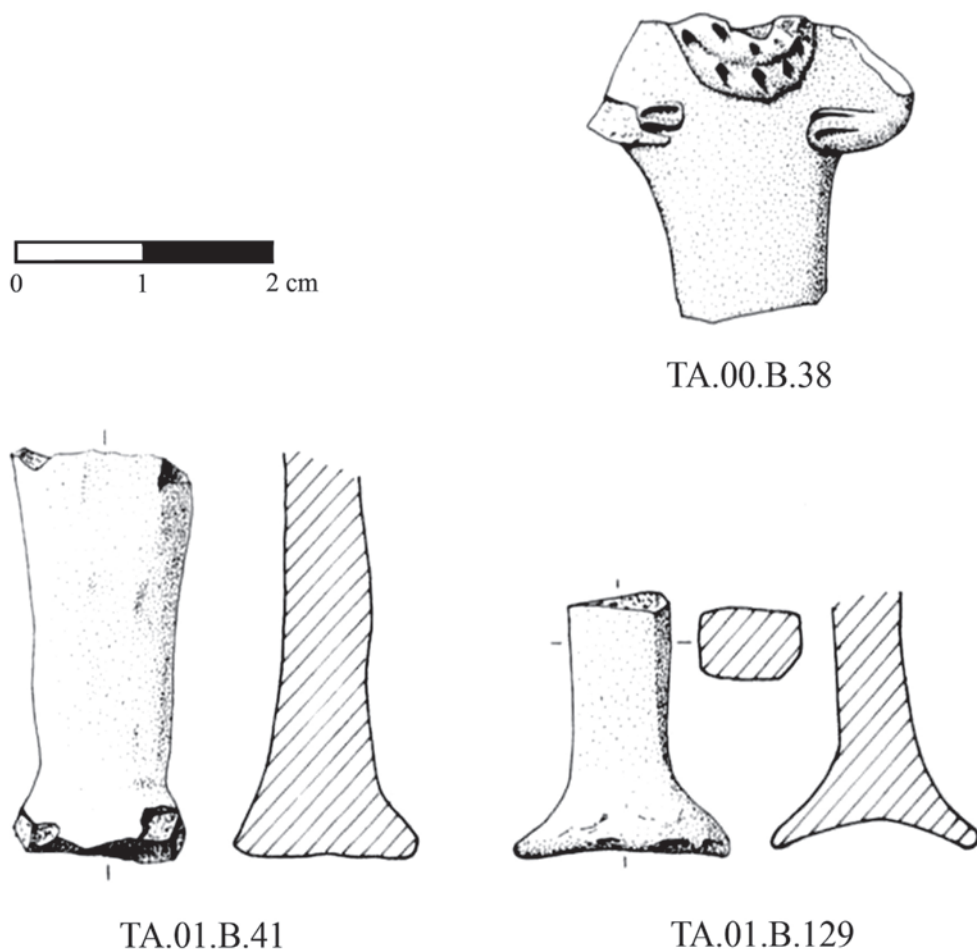


Figure 10.8. Tell Afis, fragments of three clay female figurines, TA.00.B.38; TA.01.B.41, and TA.B.129 (after Scandone Matthiae 2002, figs. 8.1, 8.2, and 8.4).



Figure 10.9. Saraqeb, tomb assemblage (after Suleiman and Gritsenko 1986, plate I:1).

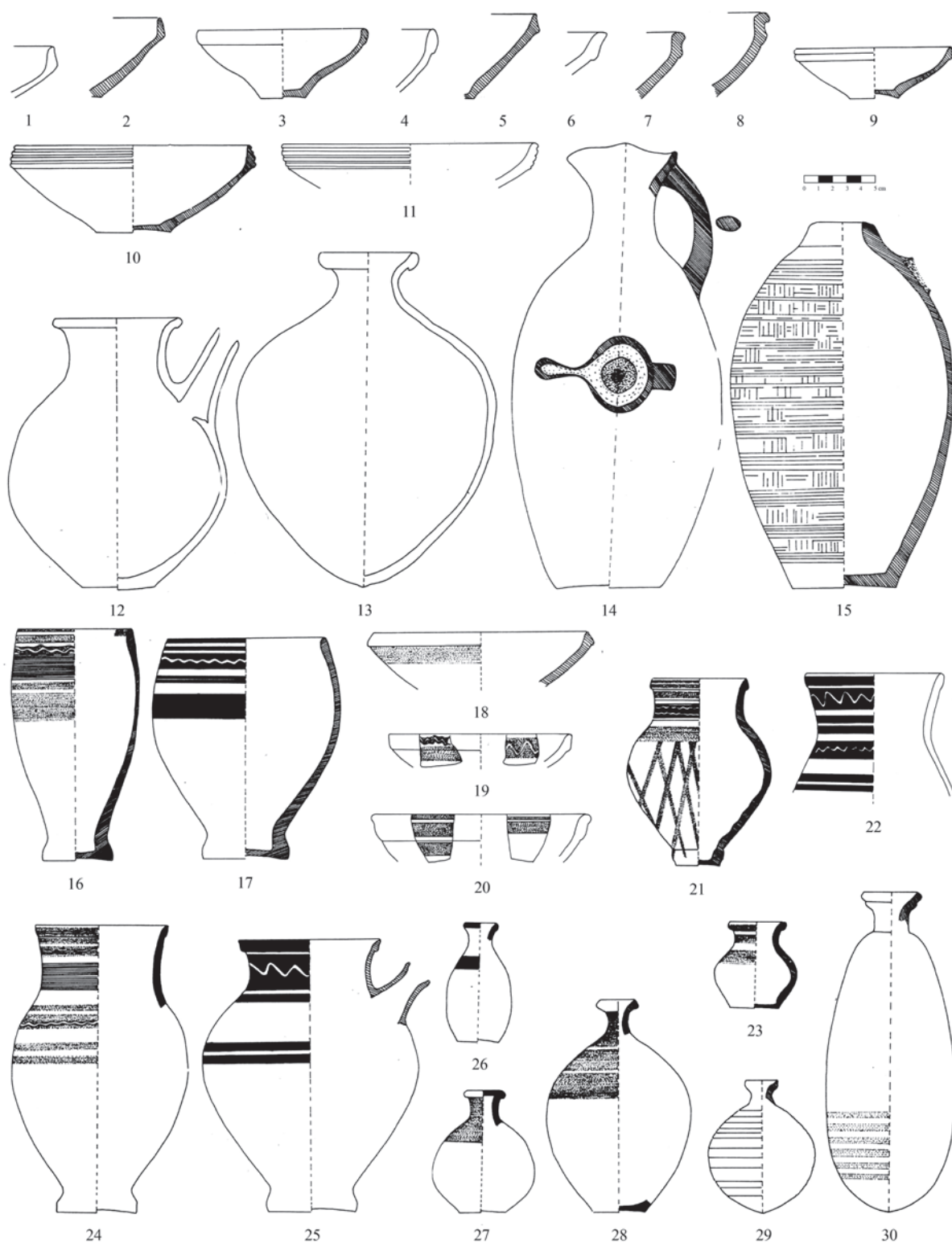


Figure 10.10. Saraqeb, selection of EB IV vessels from tomb assemblage (nos. 1–18, 21, after Suleiman and Gritsenko 1986, figs. 1:1–2, 4–6, 9–13, 14, 17–18, 20, 2:1–6, 11–13, 15, 3:2–5, 7, 9–11) and Ansari (nos. 19–20, 22, after Suleiman and Gritsenko 1986, fig. 3:2–3, 5).

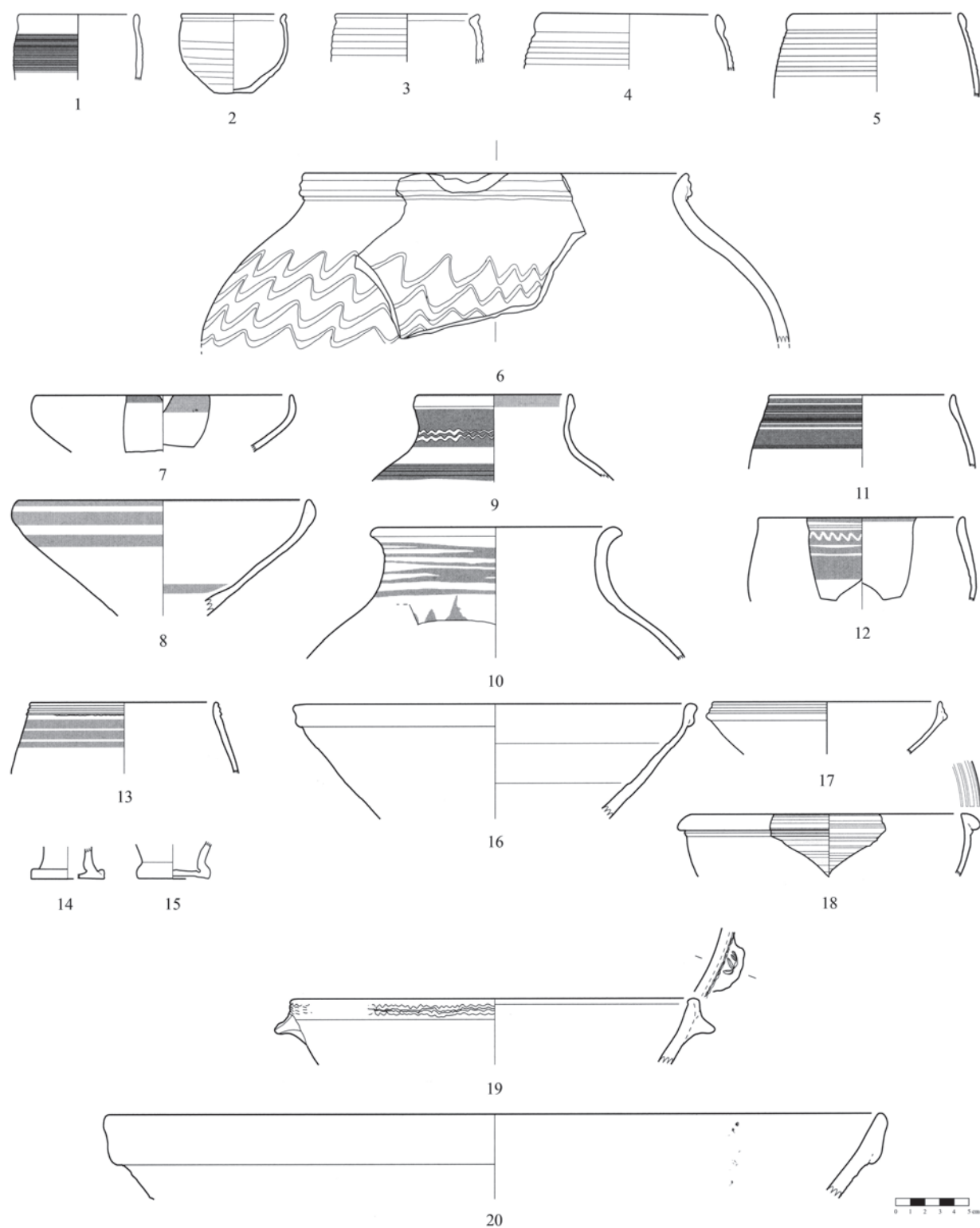


Figure 10.11. Tell Mastuma, selected EB IVA (nos. 1–6) and EB IVB (nos. 7–20) pottery from Levels XI (nos. 5, 14–15) and IX (nos. 1–4, 6–13, 16–20) (after Wakita 2009, figs. 5, 3.8:1–4, 8, 11–15, 19, 23, 26, 3.9:5, 17, 25–26); reproduced here by courtesy of the Ancient Orient Museum, Tokyo.

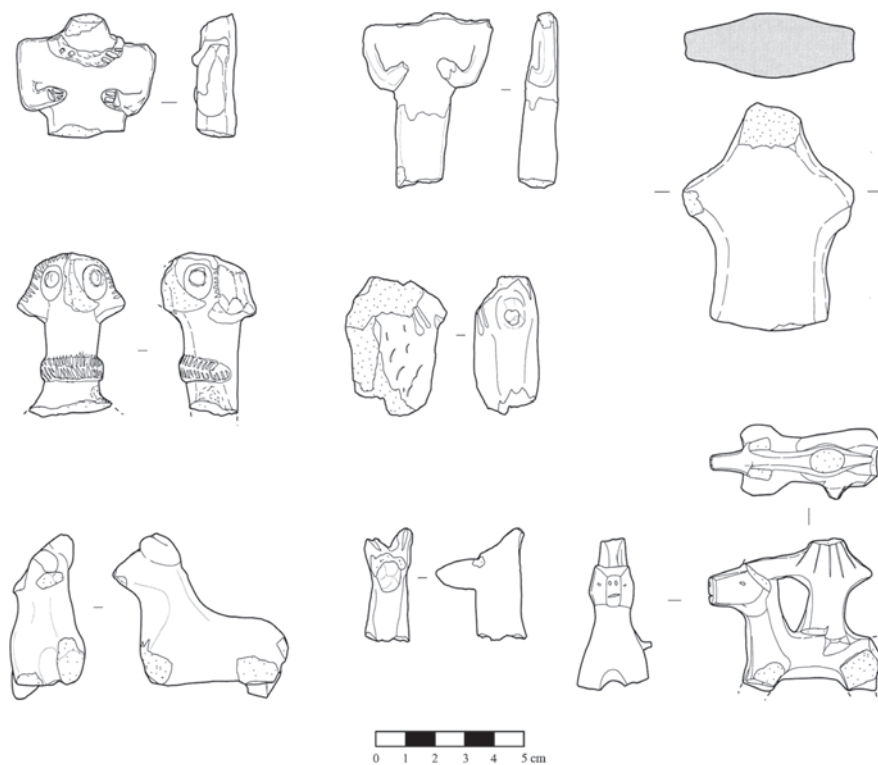


Figure 10.12. Tell Mastuma, EBA figurines from Period A (after Nishiyama 2009, fig. 8.33:3–10); reproduced here by courtesy of the Ancient Orient Museum, Tokyo.

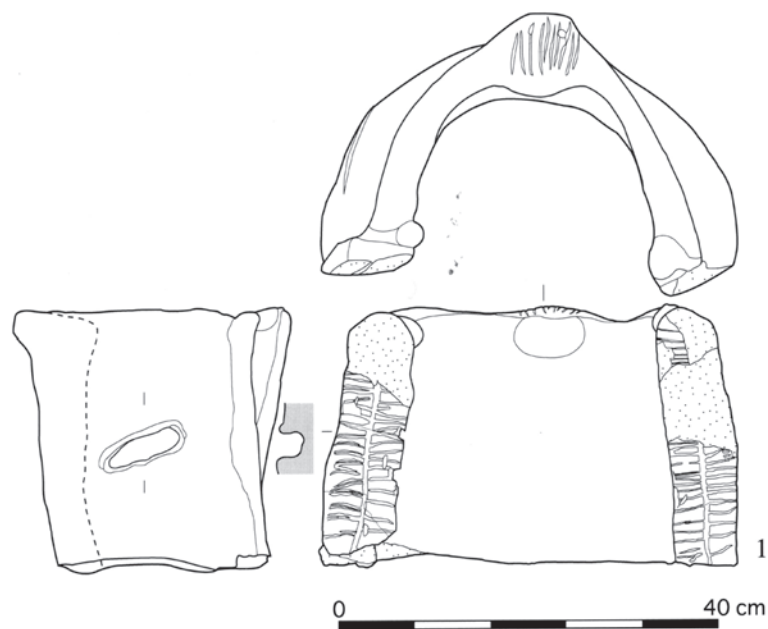


Figure 10.13. Tell Mastuma, unbaked clay hearth from Stratum VII (after Nishiyama 2009, fig. 8.34:1); reproduced here by courtesy of the Ancient Orient Museum, Tokyo.

CHAPTER 11

REGIONAL APPROACH AND ARCHAEOLOGICAL SURVEYS IN NORTHERN SYRIA

An Overview

S. Mantellini

1. INTRODUCTION

Northwestern Syria can be considered a representative and fundamental area for understanding the development of urbanization and the rise of complex societies in the Near East during the third millennium B.C. Since the last century, this region has been investigated in an attempt to obtain new data to analyze the formation of large urban settlements, major regional centres, and capital sites such as Ebla (Matthiae 1993b, 523).

Common to many other contemporary archaeological explorations in the Old World, these early surveys were often conducted to single out a site representative of the region to be subsequently investigated in detail through stratigraphic excavation (Ammerman 1981, 63; Wilkinson 2000, 220; Akkermans and Schwartz 2003, 12; Alcock and Cherry 2004, 3). This approach was useful in supplying a reliable chronological sequence to compare the artifacts collected on other neighboring sites as well as to achieve a regional archaeological inventory. This was considered an indispensable point of departure in planning additional research (Hole 1980, 40); however, scant attention was devoted to the environmental context in which these settlements developed.

A remarkable shift in such a strategy took place only at the end of the last century and it resulted in a dramatic collection of archaeological data acquired at a regional scale, especially in the

Mediterranean (Alcock and Cherry 2004, 4) and Mesopotamia (Ammerman 1981, 71–74). Since then archaeological surveys began to be conducted in conjunction with natural sciences studies—such as geomorphology, geography, ecology, botany, and faunal analysis—with the purpose to enhance the interpretation of long-term patterns in settlement organization and landscape development (Philip, Jabour, et al. 2002, 2). This advance resulted in the increasingly important role played by archaeological surveys at a regional scale (Akkermans and Schwartz 2003, 11); in the northern Levant it was particularly useful to compensate for the “virtual absence of systematic survey data” (Philip, Jabour, et al. 2002, 2).

The opportunity to start a long-term investigation program in the territory of Tell Mardikh/Ebla within the Ebla Chora Project (hereafter ECP) suggested the idea of a systematic collection of the regional archaeological studies carried out in northwestern Syria in the last decades.¹ This work does not claim to provide an historical-archaeological synthesis of regional surveys as done for Mesopotamia (Wilkinson 2000), but rather serves as a chronological and methodological assessment of the investigations carried on in this part of the Near East, with the aim of emphasizing common features and shared problems. Moreover, this synthesis is not intended to provide neither an history of the archaeological landscape nor a comprehensive study of all the archaeological research conducted

in northwestern Syria, which would be a task both complex and long. The description is limited to the basic information available for each survey, including a selected bibliography regarding the results and the methods employed during fieldwork.

Noteworthy, but outside the scope of this work, are also the first extensive surveys of the region, such as the study of the classic monuments in the region of Hama by Lassus (1935), the analysis of the Byzantine remains by Tchalenko (1953–1958), and the survey of the Prehistoric sites between Syria and Lebanon by Suzuki and Kobori (1970). Several salvage projects associated with the construction of dams in the middle-upper Euphrates were also not considered, although they expanded substantially the information on the number of archaeological sites in those regions (Wilkinson 2000, 222).

Archaeological survey can be considered an essential step in any long-term program of investigating a region's human history (Hole 1980, 21); accordingly, the most important aim of this paper is to provide a useful term of comparison for the forthcoming fieldwork scheduled in the area surrounding Ebla. From a methodological point of view, the attention is thus focused on the strategy adopted by each team in surveying the territory investigated.

In this regard, in the past twenty years some projects have contributed significantly to the remarkable development of field survey techniques, especially in the off-site archaeology promoted by Wilkinson (2000, 222; Akkermans and Schwartz 2003, 12), which proved particularly valuable in detecting the traces of past land-use systems and landscape features (Wilkinson 1982; 1993a, 548). Similarly, remote sensing techniques have successfully improved the knowledge of the archaeological landscape in which the major centres and their satellite settlements developed. Remote sensing application to the archaeology of the Near East is so widespread today that it makes the mapping of early settlements through satellite imagery a central element in the landscape analysis of this region (Menze and Ur 2012, 779).² The diverse

knowledge achieved in such fields of investigation allowed to combine the early extensive approach based on the reconnaissance of typical mound-shaped site with the intensive survey of artifact scatters, linear hollows, and soil color (Wilkinson 1982; 1993a; Wilkinson and Tucker 1995).

Among the many pre- and historical periods considered within the regional projects, mostly ranging from the Paleolithic to the Ottoman Age, the focus here is on the Early Bronze Age, especially on EB IV and particularly on EB IVA (Mardikh IIB1, ca. 2400–2300 B.C.), the period of the Royal Archive of Ebla. This is especially important for the ECP as it attempts to combine the data collected on the territory with the information provided by the clay tablets unearthed in 1975.

2. ARCHAEOLOGICAL REGIONAL SURVEYS IN NORTHWESTERN SYRIA

The areas described here follow the order on the map in Plate 18. The results of each survey are briefly summarized in Table 1.

2.1. Islahiye Region

After the German excavations and explorations in and around Zincirli Höyük, a very preliminary and limited survey was conducted in 1949 by the team from the British Institute of Archaeology in Ankara excavating Coba Höyük under the direction of Waechter (du Plat Taylor, Seton Williams, and Waechter 1950, 59–61). This survey covered the surroundings of Sakce Gözü, under excavation by the British expedition, and uncovered sixteen sites (ibidem, 58, fig. 1). The pottery collected ranged from the Chalcolithic to the Roman period. This work was to be followed by a more detailed survey in the spring of 1950 (ibidem, 57) that never occurred.

Subsequently, a broader and more systematic archaeological work in the Amanus area was carried out by Badahır Alkım between 1955 and 1972. This was done within the framework of a long-term research project under the sponsorship of the Turkish Historical Society, the Turkish

Directorate General of Antiquities and Museums, and the University of Istanbul (Alkım 1969).

The survey intended to investigate the central sector of the Amanus mountains and the narrow plains below their eastern slopes. The main focus was on the archaeological sites and the major and minor routes and passes running throughout the Amanus range to the west and the Kurt Dağ to the east. One such pass, the pass of Arslanlı Bel linking Cilicia and Syria, had never been studied before. More than forty ancient sites were discovered, which belonged to the mound-shaped type, i.e., höyük or tell. Most sites dated to the third millennium B.C., some to the second millennium B.C., and many others to the first millennium B.C. (ibidem, 282).

This project also resulted in the systematic analysis of the key sites of Tilmen Höyük, Gedikli Karahöyük, and Kırıskal Höyük, in order to compare the surface finds with those delivered by a stratigraphic sequence (cf. Marchetti 2011, 12–19).

2.2. Amuq Valley

Because of its richness in archaeological evidence, the Amuq valley (also known as plain of Antioch or Amik Ovası), in the Hatay region of southern Turkey, represents one of the major regions investigated for archaeological and historical purposes ever since the first half of the twentieth century.³ An updated synthesis of the settlement pattern development in the Amuq valley, from the EBA to the Late Antiquity, has been provided by Casana (2007), who also offered a comparison with other regions of the Ancient Near East.

The first systematic exploration of the mounds in the Amuq was conducted in 1933 by Braidwood within the Syrian Expedition of the Oriental Institute of the University of Chicago in the Plain of Antioch (Braidwood 1937; Braidwood and Braidwood 1960).

The survey started in the late spring of 1936. The excavation of three major sites such as Chatal Höyük, Tell Taynat, and Tell al-Judaidah provided a ceramic sequence useful for comparing the pottery collected on the tells (McEwan

1937). The main goal of this exploration was a comprehensive record of all the archaeological features in this area, with specific attention to the pre-classical, typically mound-shaped sites (Braidwood 1937, 1). Most of the sites were recorded on topographical maps and then visited on the ground (ibidem, 2n1). Otherwise the position of the mounds was fixed by means of topographical techniques (ibidem, 3).

The fieldwork produced 178 tells (ibidem, 20–37) that were classified into fourteen periods, from Neolithic to Islamic times, according to the ceramic chronology of Tell al-Judaidah (ibidem, 4–7). Pottery of the third millennium B.C. (Phases IX, X, and XI at Tell Judaidah) was recovered in thirty-eight sites, but fifteen other sites likely belong to the same period.⁴ EBA pottery (Phase IX at Tell al-Judaidah) was apparently found only at one site: Tell Tulul (no. 146).

The pioneering work of Braidwood was noteworthy for its time in terms of conception and technique (Casana and Wilkinson 2005b, 25), and it is commonly accepted as the first systematic survey at a regional level in this part of the Near East (Akkermans and Schwartz 2003, 11).

Braidwood's investigation was resumed fifty-seven years later, when the Oriental Institute of Chicago established the *'Amuq Valley Regional Projects* (hereafter AVRPP). Yener was the director of the expedition, whereas Wilkinson was in charge of the archaeological and geomorphological surveys (Yener et al. 1996; Yener et al. 2000; Yener and Wilkinson 1997; Yener 2000; 2005; Casana 2003).⁵

Agriculture, water, location, and control of precious material sources represent the major features of attraction of the Amuq valley (Yener et al. 1996, 51); therefore, the AVRPP was set up in this area in order to understand past settlement patterns, systems of land use, and the development of administrative relations between town and country over time, in a region that can be considered as a bridge linking the Near East to the Mediterranean (Yener et al. 2000, 165).

As stated by the name, the AVRPP was conceived as a series of coordinated field projects (Yener

2005, 1) in which the archaeological survey and excavations were carried out along with the geomorphological studies of the plain, the investigation of the mineral resources, and the geophysical prospecting at the intra-site level (Casana and Gansell 2005; Batiuk, Harrison, and Pavlish 2005, 175–76; Batiuk 2007, 54–55). As a consequence, the number of the institutions involved is also significant. The archaeological reconnaissance of the mounds was conducted jointly with the University of Toronto in the Amuq plain (Harrison and Batiuk 2001; Batiuk 2007) and with the Mustafa Kemal University of Antakya in the Orontes Delta (Pamir 2005). The activities of the University of Toronto were especially focused on Tell Taynat (Yener, Harrison, and Pamir 2002; Batiuk and Burke 2005; Batiuk, Harrison, and Pavlish 2005) and on the salvage of some archaeological sites seriously damaged by bulldozer activities and land reclamation (Yener 2000, 192–95). Specific attention was directed to the now dried Antioch lake, which until a few decades ago was the main water body of the region. Thus, a geomorphological study was undertaken with the purpose of researching its relation to the development of settlements and connections system throughout the basin (Wilkinson 1997; Wilkinson et al. 2001). Finally, the last season of work of the AVRPP was carried out by Gerritsen of the Netherlands Institute in Turkey, who headed a team surveying the plain for two weeks in the summer of 2005. Whilst the attention of Yener's expedition was mainly directed towards the Bronze and Iron Ages, Gerritsen focused instead on two different, large ranges of time: the Neolithic and Chalcolithic on the one hand, and the Hellenistic to the Ottoman periods on the other (Gerritsen et al. 2008, 241).

Undoubtedly, the archaeological survey in the Amuq valley, and the AVRPP more generally, stands in a prominent position within the regional studies because of its systematic and methodological approach, its research on long-term settlement patterns, and finally the number of publications in which it resulted. According to Gerritsen et al. (ibidem, 242) "to date, published archaeological syntheses of this nature are rare".

Along with the excavation of the three major sites of Tell Kurdu, Tell Atchana-Alalakh, and Tell Taynat, a specific program of territorial investigation was launched in order to record all the archaeological sites as well as to study the environmental features of the valley and its surroundings.

The first inventory by Braidwood was successfully improved thanks to the exploration of areas not investigated before, such as the uplands around the plain and the dried bed of Antioch lake, which was filled with water at the time of Braidwood's exploration.⁶ The combination of different surveying techniques, the availability of topographical maps at different scales (1:5,000 to 1:50,000) and later of CORONA satellite imagery, and the use of a GPS for positioning the sites⁷ increased to 346 the overall number of sites discovered during the survey in the Amuq plain from 1995 to 2002 (Casana and Wilkinson 2005a).⁸ In spite of the uncertainties in dating the settlements, caused both by physical transformations of the environment, such as erosion and alluvium deposits, and by cultural transformations affecting the preservation of sites, it is however possible to outline the main phases of development of the settlement pattern in this region (Casana and Wilkinsons 2005b, 37). The occupation during the third millennium B.C. (Amuq Phases G-M) is attested in sixty-five sites, and the EBA occupation (Amuq Phases G-J) in fifty-three sites. The Bronze Age and the Iron Age periods are characterized by a landscape of nucleated tell-type settlements, almost exclusively located in the lowland plain and along the tributary valleys (ibidem, 38). The BA and IA settlements indicate a clearly defined settlement hierarchy based on the size of the site (Batiuk 2007, 52), where Tell Atchana and Tell Taynat are the major centers, Chatal Höyük and Tell al-Judaidah belong to the lesser tier, and some ninety tells, about 1 to 5 ha in size and 1 to 10 m in height, lie at the lowest tier (ibidem, 39).

Finally, the survey conducted between 1999 and 2001 in the Orontes Delta demonstrated that this area was highly settled only from the Classical period on. Fifty-five sites show evidence of a

Hellenistic and Roman occupation. BA pottery has indeed been collected only in two sites, and IA pottery from five sites. Differently from the Amuq, the pre-Classical sites are located on natural hills rather than on the lowland (Pamir 2005, 72–74).

2.3. Ugarit

After an initial account of thirty-eight sites published by Saadé (1964), the Mediterranean coast and the hinterland corresponding to the administrative district of Lattakia, including the environs of Ras Shamra-Ugarit, Jebleh, and Akkar, were the object of a few non-systematic explorations conducted by various scholars at different times. However, it seems that a systematic archaeological investigation of the whole Jebleh Plain has been scheduled for the coming years by the Syrian Department of Antiquities (Bretschneider and Hameeuw 2011, 70).

After a preliminary location of fifteen sites (nos. 1–15) by Saadé (1964, 92–95), the environs of the ancient kingdom of Ugarit were surveyed by the Syrian-French expedition working at Ras Shamra. However, these investigations were carried out randomly. Tells located in remote places were missed, and the mountains to the north and east of Ugarit were left unexplored (Saadé 2011, 413). The early inventory (Saadé 1964, 91–107; 1979, 57–61; Courtois 1973, 56–57, fig. 1) has been updated recently, and the number of archaeological sites recorded increased to forty-three (Saadé 2011, 413–22, fig. 116). BA pottery was found in twenty-five sites, including the four sites chosen for stratigraphic sounding (Ras el-Bassit, Ras Ibn Hani, Tell Siano, and Tell Sukas), whereas the EBA occupation is attested in nine sites.

In 2008 a geomorphological study of this area was conducted with the aim of a paleoenvironmental reconstruction of the coastal landscape in connection with the development of the major harbor centers of the Kingdom of Ugarit (Al-Maqdissi et al. 2010, 47–49).

2.4. Jebleh Plain

The survey of Saadé (1964, 95–101) recovered twelve sites (nos. 16–27).

Later work by the *Carlsberg Expedition to Phoenicia* in the Jebleh Plain is to be considered as “casual observations and notes” rather than a systematic survey (Riis 2004, 12).

A 1958 preliminary topographical study of this area during the season of excavation at Tell Sukas (Riis 1959, 111, fig. 1) was followed, between 1958 and 1963, by a survey that resulted in the recovery of fifty-five archaeological sites, detected by driving, sailing along the coast, and horseback riding (Courtois 1973, 56–57, fig. 1). Only recently has the area been researched in an attempt to understand the relationships between human settlement strategies and environmental adaptation (Thuesen 2004, 22). In spite of the difficulty to attribute a chronology to the pottery collected on the field, it is possible to outline the main periods of settlement in the region. The sites with BA occupation are eight, five of those with certain EBA pottery. They are well distributed from coast to inland, most likely in relationship to the intensive exploitation of the area for agricultural purposes (ibidem, 26).

In recent years, a paleoenvironmental and climatic study was initiated in an attempt to reconstruct the coastline landscape and the environs of Tell Tweini. Archaeological investigation combined with geophysical, geomorphological, and palynological studies demonstrated that during the BA Tell Tweini was a seaport, most likely the ancient Gibala mentioned in the administrative texts from Ugarit (Al-Maqdissi et al. 2007, 6). The result of this research served also as the basis for a further detailed investigation on the environmental history of this area in the late second–early first millennium B.C. in relation to climate forcing and human activities (Kaniewski et al. 2008; Kaniewski et al. 2010; Kaniewski et al. 2011).

2.5. Akkar

The Akkar plain, extending between Syria and Lebanon, represents a fertile area located at the intersection of the most important east–west and north–south routes connecting the Mediterranean with inland Syria. It must therefore be assumed that this region was always densely settled (Bartl 1998–1999, 171). The plain of Akkar has been

the object of various archaeological studies over the last fifty years, well summarized by Bartl (*ibidem*, 173) and Thalmann (2000, 1617–18; 2006, 210–11), who both conducted systematic surveys in this region. A specific study on the dynamics of the settlement pattern, in particular during the EBA, in relation to the exploitation of the resources and the development of the irrigation system along the Nahr el-Abrash has been conducted by Sapin (1980).

A preliminary list and description of eleven sites is included in Saadé's inventory (1964, 102–4) in the district of Lattakia. A second exploration dates back to June 1968, when Ciasca, of the Sapienza University of Rome, aimed to locate the IA sites north of Tripoli and in the Beqaa valley (Saidah 1969, 142). Fifteen sites were visited but a complete report of this work is still unpublished (Bartl 1998–1999, 173).

In 1986–1987 a joint French-Syrian research under the direction of Al-Maqdissi and Thalmann was conducted north of Tell Arqa in order to explain the development of the settlement pattern in the plain of Akkar (Thalmann and Al-Maqdissi 1989; Thalmann 2000; 2006; 2007).

At first twenty-eight tells were located using 1:50,000 scale maps, field visits, and then analyses based on both chronology and size. Three periods of occupation were specifically attested: EB IV and Middle Bronze Age, Hellenistic, and Byzantine-Medieval (Thalmann and Al-Maqdissi 1989, 99; Thalmann 2000, 1621–23; 2006, 213–15; 2007, 220–21).

Small sites placed in the periphery of the plain and in the valley bottoms of the lower hilly areas are very representative of settlement patterns before 2500 B.C. (Sapin 1978–1979).

The most noteworthy considerations are in regard to EB IV, around 2400 B.C. (Phase P at Tell Arqa), when the high-density plain settlements suggest a full colonization for agricultural purposes (Thalmann and Al-Maqdissi 1989, 98; Thalmann 2000, 619; 2006, 212–13; 2007, 221). The size and distribution of the sites indicate that in this period the plain was organized in three small

territorial units with a regular and hierarchical arrangement of the settlements around the major urban regional centers of Arqa, Kazel, and Jamous (Thalmann 2000, 1622; 2006, 213–15; 2007, 221–22).

In the autumn of 1997 Bartl (1998–1999) led the works of a German expedition for six weeks. This survey, carried out in the Lebanese area of the plain, aimed to record the archaeological sites of the region and to analyze them according to their historical and sociopolitical context (Bartl 1998–1999, 173).

Topographical maps of different years and scales were used during the fieldwork (1:20,000 of 1962–1963; 1:50,000 of 1933; 1:50,000 of 1989), when the sites were located by means of GPS (*ibidem*). The pottery collected was then classified according to the sequence of Tell Arqa (Thalmann 2000, fig. 2; 2006, 212, fig. 85). The investigations resulted in the recovery of forty-one archaeological sites, including eighteen settlements, eight probable single houses or farmsteads, and eight necropolises or groups of tombs; the rest were worked bedrocks. The settlements were of small and medium size, though none of them reached the dimensions of Tell Arqa (Bartl 1998–1999, 175).

The density of the settlements was low during the Prehistoric period, whereas it increased in later times. The highest peak occurred between the third century B.C. and the six–seventh century A.D. (*ibidem*, 178).

2.6. Homs Gap

The relatively flat passage connecting the Mediterranean coast with the Syrian hinterland, also known as Homs Gap or Akkar Gap, was surveyed in 2004 and 2005 by a joint Syrian-Lebanese-Spanish expedition directed by Al-Maqdissi, Haïdar-Boustani, and Ibáñez (Haïdar-Boustani et al. 2005–2006; 2007; Ibáñez et al. 2008).⁹

The survey aimed to create an inventory of all the sites in this region, from the Lower Paleolithic to the Ottoman period, with special attention to the origins and development of the Neolithic

and the urbanization process at the end of EBA (ibidem, 187).

The project researched an area of 560 km², from the Orontes river valley to the basalt landscape and the Buqaia basin, and resulted in 132 archaeological sites (ibidem, 189).

The site locations were identified using topographical maps, CORONA satellite imagery, toponym studies, and field surveys combined with information earned from locals (Haïdar-Boustani et al. 2005–2006, 18–21).

The artifacts belonging to the EBA and MBA periods were collected over twenty sites, and most of them were located along an east–west route in the southern part of the researched area. This may be in connection with a likely commercial route linking the coast to the inner Syrian regions (ibidem, 11; Ibáñez et al. 2008, 191). Apparently, this route was not controlled by any major site (ibidem, 193). The investigation also provided evidence of an important megalithic phenomenon widespread throughout the whole area of investigation and attested by the presence of nearly a thousand monuments that should also probably be attributed to the Bronze Age (Haïdar-Boustani et al. 2005–2006, 12–13; Ibáñez et al. 2008, 192).

2.7. Homs

The Homs area, which forms a bridge between the Mediterranean coast and the Syrian hinterland, has been the subject of a long-term and multidisciplinary project since 1999. The *Settlement and Landscape Development in the Homs Regions* (hereafter SHR) is a joint project between the University of Durham and the Syrian Directorate General of Antiquities and Museums, directed by Philip and Jabour (Philip, Jabour, et al. 2002; Philip et al. 2005; Philip et al. 2007; Philip 2007; Philip and Bradbury 2010; Bradbury and Philip 2011; Philip, Bradbury, and Jabour 2011).

Together with the Amuq Valley Regional Projects and the *Land of Carchemish Project*, the SHR project provides a remarkable basis to compare the methodological approach, field investigation

techniques, and remote sensing analyses used for the detection of tells, off-sites, and any other anthropogenic landscape features.

Based on the historical importance of the area and the meager attention received by previous scholars, the SHR project aims to analyze the settlement dynamics and the landscape development in a long-time perspective and in different environments, considering the area of investigation to be representative of the western Syrian landscape (Philip et al. 2002, 1; Philip 2007, 218; Philip et al. 2007, 69). A specific geological-geographical study of the Orontes river valley and its terrace deposits has also been carried in the first part of the project (Bridgland et al. 2003).

An updated assessment of the archaeological monuments in the region was urgently required due to the ongoing site destruction because of agricultural expansion (Newson 2006, 50; Philip 2007, 218).

In order to investigate the three environmental zones characteristic of this region (marl, alluvium, and basalt plateau), two sample areas have been selected for exploration: the Northern Study Area, or NSA, to the northwest of Homs and covering some 180 km²; the Southern Study Area, or SSA, to the southwest of Homs and extending over 400 km² (Philip, Jabour, et al. 2002, 3).

Since the project does not simply aim to detect and localize sites, but also to record other categories of archaeological evidence such as field systems, land boundaries, communication routes, water management installations, and irrigation systems (ibidem, 7), different approaches and techniques have been employed and combined in a unique methodological framework.

The fieldwork was preceded by a preliminary analysis of topographical maps and satellite photographs aimed to detect sites such as tells and other evidence due to anthropogenic activities (ibidem, 8–9). Among the satellite imagery, CORONA series “played a key-role in site prospection” (Philip et al. 2005, 30), and was particularly successful in locating settlement

types, ancient field systems, cairns, and corrals (Philip, Jabour, et al. 2002, 20).¹⁰

Field activities were conducted combining extensive tell reconnaissance and intensive surveys, whereby off-sites and flat artifact scatters were located by means of field-walking and sometimes even transects (*ibidem*, 6–7; Philip et al. 2005, 31–32).

The investigation recorded 101 sites in the marl landscape of the SSA, including twenty-one tells and eighty flat sites, most of the latter dated to the Greek-Roman and Islamic periods (*ibidem*, 30). Here the Bronze Age landscape is characterized by tell-based settlements, which are generally quite small and appear along the now dry wadis systems to the east of the Orontes valley as early as EB IV (Philip, Jabour, et al. 2002, 18–19; Philip et al. 2007, 70). Sites recorded during the field visits in the NSA are more than 200, and they occur in three main forms: tells, structures/enclosures, and cairns (Philip and Bradbury 2010, 141). The tells are few, generally small, and located in the valley bottom, usually close to seasonal watercourses. Differently from the marl landscape, the tells here were settled from the Hellenistic to the Byzantine periods, thus potentially covering the earlier phases (Philip and Bradbury 2010, 142). The subcircular or irregular structures are frequently found in clusters. Twenty of the seventy-five structures were visited and they provided material dated to the Chalcolithic-EBA. However, their layout, size, chronology, and exploitation seem to differ according to the three main typologies identified: grouped irregular structures, grouped rectilinear structures, and single rectilinear structures (Philip, Bradbury, and Jabur 2011, 41–42). Finally, the cairns are the most widespread archaeological evidence in the NSA basalt.¹¹ Analyses of CORONA satellite imagery allowed the identification of more than 30,000 cairns, 525 of which were visited and recorded on the field (Philip and Bradbury 2010, 146; Bradbury and Philip 2011, 173). These cairns differ in size, morphology, shape, building material, and associated features, and their chronology ranges from the Chalcolithic-EBA to the nineteenth century A.D. (*ibidem*, 173–76).

However, it is likely that a good part dated back to Chalcolithic-EBA (Philip and Bradbury 2010, 146–47).

It is worth noting that during the years several landscape subprojects have occurred within the SHR, each one focusing on specific issues. The first concerns the study of the Qatina lake, one of the few bodies of standing water in western Syria, and thus relates to human activity in the local landscape. The study of the lake sediments might provide useful data for a paleoenvironmental reconstruction (Philip, Jabour, et al. 2002, 14; Philip 2007, 221–23). A second study regards the landscape of the Dar es-Salaam, and it is aimed to understand whether the expansion of agriculture during the Greco-Roman period was due to state or individual control of the rural landscape (Newson 2006; Philip et al. 2007, 72). Finally, a specific project was devoted to the study of the stone cairns (Homs Cairn Project, HCP) in order to assess the distribution and the typologies of these structures in the region (Bradbury 2008; 2009; Bradbury and Philip 2011).

2.8. Qatna

The earliest investigation of Qatna and its environs goes back to the first half of the nineteenth century, when du Mesnil du Buisson visited four tells (Tell Hana, Tell Ghazali, Tell Ruehini, and Tell Ada) during the fourth excavation season at Tell Mishrife-Qatna (du Mesnil du Buisson 1929, 244–47; 1930, 160–63).

After that, a systematic exploration of the tells in Qatna hinterland was conducted only recently with the Syrian-Italian-German expedition directed by Al-Maqdissi and Morandi Bonacossi (Al-Maqdissi and Morandi Bonacossi 2005; Morandi Bonacossi 2007a; 2007b; 2009; 2010; Al-Maqdissi et al. 2008).

The main goal of this research program was to reconstruct the urban development of Qatna in relation to the settlement and land-use patterns of its hinterland. Specific attention was given to the period in which Qatna was the major center in the region, i.e., from the mid-third to the early second millennium B.C. (Morandi

Bonacossi 2007b, 64–66). The approach was based on a combination of archaeological survey and paleoenvironmental studies, compared with the results obtained during the several seasons of excavation at Tell Mishrife-Qatna.¹² The archaeological investigation of the region allowed the recording of twenty-five sites (ibidem, 71).

Very interestingly, in the second half of the third millennium B.C. seventeen small settlements of one–two hectares appeared at regular intervals along the two later wadis. This data, compared with the few sites of the previous period, suggests that the “sudden growth of a two-tiered settlement system, consisting of a network of rural villages regularly distributed around Mishrife, was strictly connected (and the consequence of) the emergence at the site during the EB IV of an urban centre acting as regional central place” (ibidem, 72; 2010, 2). This spatial organization, combined with the results of the geoarchaeological survey, indicated that the hinterland of Qatna was fully colonized for agricultural purposes as early as the EB IV. The availability of water along the wadis supported the cultivation of cereals, mainly two-row barley, legumes, grapes, figs, and olives (Morandi Bonacossi 2009, 62). This agricultural productions must be considered in relation to the EB IVA and EB IVB layers opened in the upper town of Tell Mishrife, where numerous large, multiroom granaries were constructed for an intensive mid- and long-term storage of the agricultural surplus (Morandi Bonacossi 2007a, 69). Beside agriculture, the empty space between the wadis and the area to the south of Qatna might have been exploited as “pastoral corridors” (ibidem, 72).

2.9. Al-Rawda

The microregion around Al-Rawda, in the Shamiye Region, was investigated for 100 km² by a Syro-French team under the direction of Awad and Castel in 2005–2006 (Castel et al. 2004; Castel et al. 2005; Castel 2007; Castel et al. 2008).

The project aimed to study the settlement patterns, subsistence strategies, and production systems of an EB IV regional centre in the steppe

lands (Castel et al. 2005, 53; Castel 2007, 283), on the border of the so-called arid margins (see § 2.10). From a methodological point of view, the project was characterized by a multidisciplinary approach based on the integration of archaeological surveys and excavations with archaeobotanical, archaeozoological, and geoarchaeological research (Castel et al. 2008, 5), as well as on an environmental study supported by the use of aerial photographs and satellite imagery (Castel 2007, 284).¹³

The archaeological survey conducted in the microregion of Al-Rawda provided a large number of evidence related to different types of territory exploitation (Castel et al. 2008, 37, fig. 15). Twelve of the settlements found dated to the EB IV, and they could be either sedentary or temporary settlements (Castel 2007, 289). Moreover, these settlements appear to have been organized in a four-tier hierarchy: isolated, small-size, perhaps temporary sites, which are the most numerous; small sites with enclosure, sometimes associated in pairs and adjoining one hectare in surface; sites of eight–ten ha in surface; and Al-Rawda, which is the major site of the region (Castel et al. 2008, 39). Besides the settlements, 509 tombs of different types (ibidem, 37), together with stone enclosures, kites, and other structures were discovered, thus supporting the idea of an intensive pastoral exploitation of the steppe around Al-Rawda (Castel 2007, 290).¹⁴ However, irrigated agriculture also seems to have been practiced at Al-Rawda, testifying an optimal exploitation of the environment through an integrated agropastoral economy (ibidem, 291).

2.10. Steppe–Arid Margins

The *Marges Arides de la Syrie du Nord Project* was conducted between 1995 and 2002 by Geyer and his team in the steppe to the south and southeast of Aleppo. This multidisciplinary study was characterized by a broad archaeological-geographical approach, and it included one of the most impressive surveys carried out in the Near East in terms of surface covered (nearly 7,000 km²) and number of sites recorded (a thousand) (Geyer 1998; Geyer et al. 1998; Geyer

et al. 2007; Geyer and Calvet 2001; Awad 2008; Gatier, Geyer, and Rousset 2010).¹⁵

This region corresponds to the historical contact point between the lands of the sedentary farmers and those of the nomadic herders of the Syrian desert (Geyer et al. 2007, 270). Because of the climatic conditions, settlement and agriculture were possible here only in specific contexts; therefore, dry-farming and grazing have always coexisted in a symbiotic perspective (Jaubert and Geyer 2006a, 7; Geyer, Besançon, and Rousset 2006).¹⁶ The intensive survey allowed to record some 1,000 archaeological sites, covering a chronological range from the PPNB to the Mamluk period (Geyer et al. 2007, 275).

Based on the data collected, the EB IV period was characterized by a great increase in the occupation and exploitation of the area (ibidem). The sites of that period were numerous, often large, and frequently surrounded by an enclosing wall. This situation can be explained by the successful exploitation of microenvironments suitable for the development of an integrated agropastoral economy at the regional scale (ibidem, 277). In that perspective, the coexistence of sedentary farmers and nomadic pastoralists, at least on a seasonal basis, must be considered not only as an economic necessity, but also as a form of adaptation against the instability of the environmental constraints (Geyer and Calvet 2001, 66; Geyer et al. 2007, 280).

Among the discoveries, extremely interesting is the Very Long Wall, or Très Long Mur (TLM), whose interpretation and chronology are still an open issue (ibidem, 278–80; Geyer et al. 2010; Lafont 2010). The wall is over 220 km long, drawing an irregular line from the foothill of the Jebel 'Ubaysân to the northern foothill of the Anti-Lebanon Range (Geyer et al. 2007, 278; Geyer et al. 2010, 58, fig. 1). The wall was followed on the ground and marked in over 136 spots by means of a GPS (ibidem, 59). The size of the wall, 0.9 to 1.1 m in width, its being slightly raised from the ground, and its construction in dry stone suggest that it was not built for defensive or military purposes (Geyer

et al. 2007, 278; Geyer et al. 2010, 67–69), but rather was a symbolic frontier belonging to a certain political entity and intended to mark the limits between the worlds of the sedentary farmers and the nomadic herdsman (Geyer et al. 2007, 279). The chronology of the TLM is also quite problematic, but the archaeological data related to the period of occupation of the sites nearest to it (ibidem, 279; Geyer et al. 2010, 64–67), combined with some textual information, support the theory that the TLM was built around 2400 B.C., perhaps within the historical context of the rivalry between Ebla and Mari for the control of the steppe (Lafont 2010, 86).

2.11. Middle Orontes–Hama

The Middle Orontes, between ar-Rastan and Sheyzar, was the object of an intensive archaeological survey by a Syro-German expedition headed by Al-Maqdissi and Bartl (Bartl and Al-Maqdissi 2007; 2008). Similarly to the investigation of Fortin in the neighboring area (see § 2.12), this project focused on understanding the changes in settlement patterns in a long-term perspective. The inventory of the sites was an urgent task, since they were threatened by the extension of the agricultural areas (ibidem, 244–45). The survey covered different ecological areas over an extension of ca. 600 km², including the river valley, open landscapes, limestone hills, and the basaltic zone. For five seasons starting in 2003, a total of 175 sites were discovered (Bartl and Al-Maqdissi 2008, 51), including tells, flat settlements, caves, single monuments, and tombs as well as agglomerations of pottery sherds and lithic tools (Bartl and al-Maqdissi 2007, 246, fig. 4). The sites dated to different periods, from the Neolithic to the Ottoman period (ibidem, 245). Compared to the few sites of EB I–III, EB IV (2400–2200 B.C.) shows a remarkable increase in the number and size of the settlements (ibidem, 247; Bartl and Al-Maqdissi 2008, 59, fig. 3), and most of the largest sites seem to have been inhabited continuously even during the MBA (Bartl and Al-Maqdissi 2007, 250).

2.12. Middle Orontes–Ghab

The stretch of the Middle Orontes between Sheyzar and Salhab was surveyed in 2004 and 2006 by Fortin of the Université Laval in connection with the Canadian Archaeological Project at Tell Asharneh (Fortin 2007a; 2007b; 2007c).¹⁷ The results of the survey by Courtois in 1970 were inadequate to evaluate this major site within a wider archaeological and historical frame (Fortin, Geyer, and al-Dbiyat 2005; Fortin 2007a, 20; 2007c, 254). Fortin investigated the surroundings of Tell Asharneh in order to provide a complete and updated inventory of the sites of this region, and to reconstruct the development of settlement patterns in relation to geomorphological and environmental features. The creation of such an inventory appeared fundamental, considering the high number of tells bulldozed since the 1960s because of the expansion of arable lands (Fortin 2007a, 21). The fieldwork was preceded by the preliminary identification of the potential sites on topographical maps (1:5,000, 1:20,000, and 1:50,000 scales) produced between 1940 and 1960, and through CORONA satellite imagery (ibidem, 22). The survey was conducted in two different areas. In 2004 twenty sites were recorded over an area of 250 km² along the Middle Orontes from Sheyzar to Tell Asharneh, the same area already partially explored by Courtois (1973; see § 2.13). In 2006 nineteen sites, fifteen of which unknown before, were recorded to the east of Apamea between the Orontes and the foothill of the Jebel Zawiye (Fortin 2007a, 23). The artifacts collected at the sites allow the identification of the main periods of occupation, which range from the Neolithic (12000–6000 B.C.) to the Ottoman period (A.D. 1516–1918). The survey demonstrated the high density of BA settlements (3000–2000 B.C.): fourteen sites dated to the EBA, seventeen to the MBA, and eight to the LBA. Interestingly, there are a few BA sites showing only one phase of occupation, whereas most of them were settled during the whole period without interruption (ibidem, 25).

2.13. South Ghab

In the southern Ghab plain, Courtois (1972; 1973, 63–81) investigated both sides of the

Orontes between Sheyzar and the area in which the river turns northward. Based on the use of French topographical maps at 1:50,000 scale, Courtois recorded twenty-seven sites, nine on the right bank of the Orontes and eighteen on the left one (Courtois 1973, 56–57, fig. 1). Although Courtois (ibidem, 70) reported the presence of EB pottery only in four sites (Tell Acharneh, which is also the largest in the region, Tell Squalbiye, Tell Aayun, and Tell Dubbeine), he remarked how Tell Salba was one of the rare sites without EB sherds.

2.14. North Ghab

A first, non-systematic account of the tells in the Ghab plain dates to Thoumin (1936, 490), who reported the presence of numerous mounds in the valley as a sign of a remarkable occupation in ancient times.

The survey carried out by Courtois concerned only the sites of northern Ghab, on the right bank of the Orontes river (Courtois 1972; 1973, 81–88). Using the French topographical maps at 1:50,000 scale, fifteen sites were discovered. Only nine sites (nos. 27–35) were reported on the map (ibidem, 56–57, fig. 1), whilst others six were briefly described: Tell Ibrahim, Tell Amqiye, Tell Qleidin, Tell Qastun, Tell Qarqur, and Tell et-Tell. All these sites, except the last two, present EBA materials.

2.15. Ruj Plain

The Ruj plain is a rather small natural depression, ca. 20 x 7 km, flanked by the limestone foothills of the Jebel Zawiye and Jebel Ansariye, and connecting the Middle Orontes with northern Syria.¹⁸ In the past the area was covered by an ancient lake, which was completely drained in modern times for agricultural and health purposes.

Together with the Ghab plain, this part of the Middle Orontes has received little attention by archaeologists, until Courtois (1972; 1973) attempted to fill this gap by providing an updated map of the sites along this stretch of the Middle Orontes (see also § 2.13 and 2.14). His work demonstrated the high density of BA, and in particular EBA, settlements, which covered a

large part, if not all, of the third millennium B.C. (ibidem, 98–99). The sites reported and partially described are sixteen (ibidem, 56–57, fig. 1), while fifteen more were only mentioned and planned to be explored at a later time (ibidem, 88–97). Among the tells with EBA materials, worthy of mention are Tell el-Kherkh (ca. 30 ha), the largest site of this region, Tell Hassane, and Tell Daud.

From 1990 to 1992 the Ruj basin was the object of a new systematic survey by a Japanese team of the University of Tsukuba directed by Iwasaki (Iwasaki, Nishino, and Tsuneki 1995; Iwasaki and Tsuneki 1999, 2003).

Compared to the early investigation by Courtois, which focused mainly on the BA settlements, the Japanese project attempted to understand the historical transition from the initial farming villages to the city, by means of a holistic approach combining survey, soundings, and environmental studies (Iwasaki, Nishino, and Tsuneki 1995, 143; Iwasaki and Tsuneki 1999, 84).

Based on the cultural sequence provided by the soundings at Tell el-Kerkh 2, Tell Aray 1 and 2, and Tell Abd el-Aziz, the thirty-three sites discovered in the Ruj plain were divided into ten periods (Iwasaki, Nishino, and Tsuneki 1995, 146–51), from the final phases of the PPNB (El-Rouj 1) to the Late Antiquity-Byzantine period (El-Rouj 10). The EBA settlement pattern (El-Rouj 6) is characterized by a concentration of medium-sized settlements developed in connection with agricultural practices sustained by a significant availability of water. The absence of major settlement suggests that this area might have been under the control of a large central power from outside, and this center can likely be identified with Ebla (ibidem, 152; Iwasaki and Tsuneki 1999, 91).

2.16. Jazr Plain – Tell Afis

The region of Idlib is one of the richest archaeological areas of Syria, and the settlement of Tell Afis shows an almost continuous occupation from the Late Chalcolithic to the IA (Mazzoni 2011a, 26). Despite its strategic

location as a natural crossroad connecting the Mediterranean coast with Aleppo and the Ruj plain with the Amuq valley, the Jazr plain was scantily considered during the archaeological surveys conducted in the neighboring regions. However, this region deserves special historical-archaeological attention because of its close proximity to Tell Mardikh/Ebla.

A first exploration of this area was attempted in 1980–1981 by Egami (1983), who initiated a program of investigation aimed to reconstruct the settlement pattern in the environs of Tell Mastuma. A later investigation was carried out in connection with the excavation of Tell Afis: in 1985–1986 by Ciafardoni (1987; 1992) and in the following seasons by a multidisciplinary team coordinated by Mazzoni.¹⁹

Ciafardoni's exploration sought to assess the amount of tells present in this region and to analyze the relationships between the major centres and the surrounding territory, with close attention to the pre-Classical period (Ciafardoni 1992, 37). The research considered an area with a radius of 20 km around Tell Afis, which roughly represents the distance walkable in one day (Ciafardoni 1987, 5; 1992, 37).

The area of investigation was then divided into four quadrants. The southeastern and northeastern quadrants covered a part of Tell Mardikh environs, and therefore some of the sites coincided with those surveyed by Liverani in 1964 and de Maigret in 1971–1974 (Liverani 1965; de Maigret 1978; see also Mantellini, Micale, and Peyronel, in this volume).

The recent agricultural expansion has caused the destruction of the archaeological record in the region; therefore the identification of the small, sparse settlements was quite difficult (Ciafardoni 1987, 7). Twenty-two sites, including Tell Afis, were recorded at the end of the survey. The pottery collected on the field allowed a preliminary analysis of settlement patterns showing that the highest number of sites belong to MB I-II (42 percent) and to IA I-II (40 percent), whereas EB IV is recorded in 7 percent of the sites and EBA I-III in 6 percent of the sites. According to

Ciafardoni (1992, 47), this result was in contrast with the presence of major urban centers like Tell Mardikh/Ebla and Tell Tuqan that actually arose during the EBA and MBA.

In the same years, an investigation around Tell Deinit was also carried out (Shaath 1985; 1987–1988; 2011). This survey provided evidence of seventeen sites, revealing a continuous settlement from the sixth millennium B.C. to the present. Moreover, the distribution and size of the sites suggest that Tell Deinit had a central role in this part of the region (Shaath 2011, 67).

These preliminary studies were followed by a more systematic and multidisciplinary program of investigation of the environs of Tell Afis, in which the archaeological survey was combined with geoarchaeological and geomorphological studies (Mazzoni 1999; 1999–2000a; 2005b; 2011a; Giannessi 1999–2000; Rossi 2011b).

The pottery sequence from Tell Afis allowed to refine the chronology of the material collected in the previous survey, making EB IVB, MB II, and IA II–III the most attested periods, whereas scant data concerned EB III, EB IVA, and LB I (Mazzoni 2005b, 6–8). Interestingly, Tell Suffane is the only site across the Jazr plain providing evidence of a continuous occupation during the whole third millennium B.C. (ibidem, 7; 2006b).

The settlement pattern of the Late Chalcolithic–EBA period seems to be characterized by an increasing occupation of this region and its surroundings by a hierarchical network of small-sized settlements developed around the major centres (Mazzoni 1999, 111–13). For the later periods, it is noteworthy the result of a 1999 survey that reveals the presence of numerous sites in the immediate surroundings of Tell Afis that show a major Islamic occupation (Giannessi 1999–2000, 49; Mazzoni 1999–2000a, 48).

The arrangement of the tells across the plain and the geomorphological and climatic conditions of the area, such as water availability, suggest an intensive agricultural exploitation of the territory of Tell Afis in ancient times (Boschian 1999–2000, 51; Melis 2005, 17)

2.17. Aleppo

This area is currently the target of study by the *Archaeological and Geoarchaeological Investigation of the Aleppo Hinterlands Project*, directed by Kohlmeyer and supported by the German research network TOPOI Excellence Cluster (Research Group A-I: “Central Places and Their Environment”).²⁰ The main goal of this project is to study the role of an ancient major urban centre acting as a capital and its relationships with both the settlement pattern and the territory surrounding it, with special attention to the pre-Classical period (Del Fabbro 2012, 206). In this regard, the hinterland of Aleppo during the EBA is a highly suitable case study. At that time, this area was in fact a crossroad of the main routes from Mesopotamia to the Mediterranean and between Anatolia and the southern Levant. Moreover, the fertile territory of this region was able to support a large population. An area of 30–35 km of diameter around the city has been planned for an exploration combining the remote sensing analyses with fieldwork based on archaeological and geoarchaeological surveys.

2.18. Jabbul Plain

The area around the Jabbul is very important historically because at the intersection of major trade routes crucial to the Near East economy, and because the lake is still today the major source of salt in Syria. However, salt extraction is attested only from the Middle Ages on, and not before (Schwartz et al. 2000, 448). This region was the object of archaeological surveys in 1939 and in 1996.

The former survey was carried out in the spring of 1939 by a team from the British School of Archaeology in Jerusalem and the Institute of Archaeology of London University under the direction of Maxwell Hyslop (Maxwell Hyslop et al. 1942). This region was chosen because of the strategic location of Aleppo and its surroundings in the trade routes from the east along the Euphrates valley, from Homs and Hama to the south, and from Cilicia to the northwest. The investigation was bounded by a triangle-shaped

area between Aleppo, Membij, and Meskene, and south to the northern shore of the Jabbul Lake.

The survey was conducted systematically for each site, using the French maps at 1:50,000, 1:200,000, and 1:500,000 scales of the Bureau Topographique des Troupes Française du Levant to plot the tells. Most of them were used by the French surveyors as triangulation points, thus easy to detect both on the map and on the field. The sites not included in the maps or those in areas not covered by the maps were plotted using a prismatic compass and a theodolite (*ibidem*, 20).

Among the 114 sites recorded, 109 were visited. They were classified in different groups according to their morphology and divided in eleven major periods, from the Chalcolithic to Arab times, based on surface finds. The sites dated to BA were forty-four, and most indicated an almost continuous occupation from the Chalcolithic to the Roman periods. EBA pottery was apparently recorded only in three sites: Tell Ghayariye (no. 42), Tell Hmaime Zrir (no. 56), and Tell Stabel (no. 100).

More recently, the Jabbul was systematically investigated by a joint expedition of the Johns Hopkins University and the University of Amsterdam directed by Schwartz and Curvers (Curvers, Schwartz, and Dunham 1997; Schwartz et al. 2000). Besides the excavation at Tell Umm el-Marra (Schwartz et al. 2012), the largest site in the area, this project established a long-term program of excavation and regional surveys around the lake, considering this region a key locus for studying the development of societal complexity in western Syria during the EBA (Curvers, Schwartz, and Dunham 1997, 201). Despite the strategic location and the extensive agricultural hinterland, the environs of Aleppo had been given scarce consideration before the American-Dutch project (*ibidem*, 202).

The fieldwork was carried out in 1996 in order to establish a regional ceramic sequence and document changes in environment, settlement pattern, and land use. The survey recorded 144 sites by means of topographical maps at 1:200,000 scale, ground observations, and

local informants. Fifty-three of those sites had already been surveyed by the British expedition of 1939. According to the material discovered, the archaeological evidence was classified as tells, off-sites, qanats (four), and clusters of tomb shafts. The sites recorded indicate a continuous occupation of this area from at least the Ceramic Neolithic to the present era (Schwartz et al. 2000, 447–49).

EB I–III is attested only in five sites, while forty-seven EB IV sites indicate a sharp increase in settlements in connection with the first urbanization of Syria and northern Mesopotamia. On the contrary, the decrease of settlements during MB I must be associated with the urban collapse that occurred at the beginning of the second millennium B.C. (*ibidem*, 449–51 and fig. 20).

2.19. Quweiq Basin

The area within the triangle Aleppo-Bab-Aazaz was systematically investigated by a team from the Institute of Archaeology of London University under the direction of John Matters at the end of 1970s. The project stemmed from the excavation of Tell Rifaat between 1956 and 1964, followed by a survey of settlement patterns, including their relation to the Quweiq catchment system.

Most of the field investigations were carried out in 1977 (Matthers et al. 1978). In 1978 and 1979 the sites along the Quweiq river were surveyed during an environmental study of the river and its catchment, from the Turkish border to the Matkh, and the topographical survey of eight sites in 1978 and six sites in 1979 (Matthers 1981c; Waywell and Wickens 1981, 56–57). The southernmost area surveyed by Matthers coincides with the border of the Matkh and thus will be investigated in detail by the Ebla Chora Project.

The sites marked as tells were located using the maps at 1:50,000 and 1:200,000 scales of the Bureau Topographique des Troupes Française du Levant. According to Matthers (1981b, 4), only nine sites not plotted on the maps were found. On the contrary, ten of the thirty-four sites

investigated in the first season had been wrongly marked as tells on the map, because they were located on rocky spurs but did not provide any evidence of human activity (Matthers et al. 1978, 119). During the fieldwork, a specific form (Matthers 1981b, 9, fig. 3) was filled to describe both the main characteristics of the site and the features of the surrounding environment. Only flints, diagnostic objects, and sherds (rims, bases, and other meaningful pieces) were retained during the surface collection.

The field survey produced sixty-two tells: thirty-seven in the first year and twenty-nine in the following years. Among the latter, nine were in the lower Quweiq, between Aleppo and the Matkh, and twenty in the upper Quweiq (Matthers et al. 1978, 121, fig. 1).²¹

According to the pottery collected on the field, the sites were classified into different chronological ages, from the Neolithic to the Mamluk period (fourteenth-sixteenth centuries A.D.). The sites belonging to the EB IV are twenty-two (ibidem, 123, fig. 2), and much of the pottery can be compared with the evidence found in Royal Palace G at Tell Mardikh an dated to Mardikh IIB1 (Matthers 1981a, 327).

2.20. Sajur Basin

The territory encased in the so-called Sajur triangle, between the Euphrates, Sajur, and the Syro-Turkish border, represents an unusually fertile area due to the dry-farming cultivation of cereals and the presence of green plains watered by the Euphrates.

At the end of 1970s this region was investigated by the C.N.R.S.–Université Lyon 2 expedition headed by Sanlaville (1985) and conducted in two different seasons and by two separate teams, who sometimes approached the fieldwork in different ways (Copeland 1985a, 42). In 1977 Moore (1985) explored the lower Sajur and the upper Euphrates area paying particular attention to the prehistoric sites. In 1979 Copeland (1985b) investigated the post-Paleolithic sites in the Sajur valley and adjacent area. The survey covered 1,250 km² and recorded seventy-six sites, most of

them located by means of topographical maps at 1:50,000 and 1:200,000 scales. The preliminary analyses of finds allow the identification of two Neolithic sites (sixth millennium B.C.) and three Halaf or Halaf/Ubaid sites (Moore 1985, 46). The sites visited in the 1979 survey belong to a wide chronological range, from the PPNB to the Islamic period (de Contenson 1985, 99). EB I-III and EB IVA are well represented, with fifteen and seventeen sites, respectively (ibidem, 106–8), though the MB, with thirty-six sites and one necropolis, seems to be the main period of occupation north of Menbij (ibidem, 111).

2.21. Karkemish

The area around Karkemish was partially covered by the survey of Sanlaville's team, which stopped the investigation at Jerablus Tahtani, some 5 km south of Karkemish. Because of the importance of this major center and the systematic research on this sector of Euphrates valley, the environs of Karkemish merit a special description.

In the summer of 1989 Algaze conducted a six-week-long salvage archaeological survey in the area that would be destroyed by the impending construction of the Birecik and Karkemish dams. (Algaze, Breuninger, and Knudstad 1994, 4). The survey was both extensive, in order to locate typical tell-shaped sites, and intensive, in order to detect small unrounded sites by means of field-walking and transects. The exploration resulted in more than one hundred sites, cemeteries, quarry areas, and architectural ruins that spanned chronologically from the PPN to the Middle Ages (ibidem 1994, 8). Early EBA traces (first half of the first millennium B.C.) were found in nine sites, while only five sites dated to the Middle EBA (ca. 2500–2200 B.C.) (ibidem, 12–13).

This work was remarkable in revealing some important geographical and methodological limitations to the practice of field surveys, such as the lack of a reliable master ceramic sequence (ibidem, 5). This might result in the loss of archaeological data, and especially in the possible underrepresentation or misleading interpretation of some chronological periods.

Following the appeal by Algaze, Breuning, and Knudstad (ibidem, 13) for a more detailed research in this region, the *Land of Carchemish Project* (hereafter LCP) was launched in the Syrian sector, which “seeks to provide a more balanced understanding of the archaeology of the Euphrates Region by focusing systematically on the landscape rather than exclusively on tells” (Peltenburg 2010, 541).

After the excavation at Tell Jerablus Tahtani, in 2006 a systematic geoarchaeological investigation began under the direction of Peltenburg and Wilkinson in order to provide a full archaeological coverage of the almost triangular area delimited by the Euphrates, the Sajur, and the Syro-Turkish border (Wilkinson 2007a; 2007b; Wilkinson et al. 2007; Peltenburg and Wilkinson 2008; Wilkinson and Peltenburg 2009; 2010; Peltenburg 2010; Peltenburg et al. 2012).²² The focus was on a comprehensive recording of landscape transformations, settlements, and all other evidences of human activities such as sub-surface sites, flat sites, hilltop sites, roads, and canals.

The methodological approach adopted for the archaeological survey is the same one adopted by AVRPP (see § 2.2), combining different techniques of survey and using topographical maps and CORONA satellite imagery. The latter was particularly useful to detect sites and landscape features such as major canals (Wilkinson and Peltenburg 2009, 33). The geomorphological study of the region, in particular of the Euphrates valley and terraces, also played an important role in revealing the communications network along the river valley and across it. The sites distribution shows quite clearly that the intraregional paths were aligned according to the topography (Wilkinson 2007a, 34–35).

Seventy-nine sites, mostly tells, were recorded during the field survey over an area of some 450 km² (Peltenburg et al. 2012, 193). Based on the landscape, the settlements can be classified as nucleated tell-type settlements, villages and farmsteads dispersed across the landscape, and on-hill top sites (Wilkinson et al. 2007, 219, 225).

The LCP demonstrated the change in settlement pattern from a “landscape of tells” during the fourth, third, and second millennia B.C. into a much more dispersed pattern during the Hellenistic, Roman, and Byzantine periods (Wilkinson and Peltenburg 2009, 34). By the Uruk period and the third millennium B.C., the occupation of the area seems to be clustered around the tells, and a hierarchical structure appears to characterize the settlements, which differ in size from one another. Karkemish, with its citadel and lower town (90 ha), occupies the first tier, the single-mound larger centers like Amarna form a second tier, and the smaller mounds like Tell Jerablus Tahtani are of the lowest rank (Wilkinson et al. 2007, 227).²³

2.22. Oylum

The territory of Oylum, in the district of Kilis, was partially explored during the survey of the Gaziantep region by Archi, Pecorella, and Salvini (1971, 10). A new exploration of the area was carried out in 2000 along the road Gaziantep–Kilis within the *Oylum Regional Project* before the beginning of the excavation at Oylum Höyük (Özgen, Helwing, and Engin 2002).

The survey was planned according to three main objectives. Firstly, it was meant to study the relationships between Oylum Höyük, supposed to be the main center from at least the third the first millennium B.C., and the several small satellite sites surrounding it. Secondly, the surface finds would be dated according to the stratigraphic sequence produced by the excavation at Oylum Höyük (Özgen 1986). Finally, since Kilis became a separate province in 1994, the archaeological sites have been seriously threatened by urbanization: hence an inventory of the sites in this area was urgent and necessary (Özgen, Helwing, and Engin 2002, 218).

The survey focused mainly on the visible sites (höyük, tell), but some flat sites were also recorded thanks to the information acquired from local inhabitants. Surface artifacts were collected, except for the sites completely covered by vegetation. Sixty-five höyük were registered. They mostly date to the pre-Classical period and,

except for Oylum Höyük, are of small to medium size. The flats sites are visibly represented by collapsed structures and buildings of Hellenistic, Roman, and Byzantine settlements (ibidem, 218). The majority of sites (twenty-six) belong to the third millennium B.C.; some periods are completely missing or under-represented (ibidem, 219).

2.23. Gaziantep

A very preliminary and short survey of the area around Gaziantep was provided by Waechter and his team in 1949, while investigating the area around Sakçe Gözü. (see § 2.1). Along the road between Gaziantep and the Syrian border three sites were recorded along the road between Gaziantep and the Syrian border: Homanus Höyük, Hagar Höyük, and Camus Höyük (du Plat Taylor, Seton Williams, and Waechter 1950, 57–59).

The region of Gaziantep was widely explored later, in the summer of 1970, by an Italian expedition under the direction of Archi, Pecorella, and Salvini (1971), as part of a program initiated by Piero Meriggi and aimed at creating an archaeological map of the pre-Classical sites of Anatolia.

Sites were detected using a 1:200,000-scale map drawn in 1918 by the “Abteilung der Kgl. Preuss. Landesaufnahme,” and a ground survey was carried out for surface collection. According to Archi, Pecorella, and Salvini (ibidem, 15), the survey provided 216 sites, but it is likely that many others were missed due to their state of preservation, or because supposedly located under modern constructions or in remote mountainous areas. Moreover, most of the finds were collected in sites affected by human activities, with holes and open sections. The artifacts were otherwise poor and often useless for assigning a chronology to the sites investigated. For these reasons, the periodization of the sites may be too generic or quite approximate.

The inventory includes the location of each site, its main morphological features, and its state of preservation. The environmental context was

taken into consideration, in particular with regard to the proximity of the sites to water sources. The sites were classified in different periods based on the pottery collected during the fieldwork. The BA occupation is attested by over sixty-three sites.

In recent times, five sites were visited, within a wider survey of the area by Kulakoğlu in 2005: Koçlu, Höcük, Kara mağara'nın Başı, Nalim Höyük, and Arıl Höyük. EBA pottery was found in two of them, Koçlu and Arıl Höyük (Kulakoğlu 2007).

NOTES

- 1 A preliminary account of the regional surveys west of the Euphrates is given in Matthys (1981b, 2–3), Matthys (1993b, 523–24) and Fortin (2007b, 15–16), the latter with particular reference to the Orontes valley.
- 2 According to Menze and Ur (2012, 787), in the Upper Khabur basins about 14,000 archaeological sites were recently detected over 22,000 km² solely by means of a remote sensing approach.
- 3 See a brief history of the research in the Amuq valley in Yener (2005, 4–7). A new program of territorial investigation in the northern Amuq valley is currently carried out by Lynn Swartz Dodd and it was presented at the Excavation Reports and Summaries at the 8th ICAANE (Warsaw, April 30th–May 5th, 2012).
- 4 For the criteria used in the dating and chronological classification of the sherds collected on the field as “unquestionable,” “possible,” and “probable,” see Braidwood (1937, 20n1).
- 5 More details and information concerning the AVRPs are available online at the website of the Oriental Institute of the University of Chicago (<http://oi.uchicago.edu/research/pubs/>) under the sections News & Notes (nos 148, 155, 161, 164, 169, and 181) and Oriental Institute Annual Reports (from 1995–1996 to 2003–2004).
- 6 In this regard it must be noted that the Syro-Turkish border established in 1937, and the resulting inclusion of the Hatay province in Turkish territory, resulted in twenty-four sites (13.5 percent) less than the original Braidwood's survey (Yener et al. 2000, 180).
- 7 See a detailed description of the survey techniques and methods employed within the AVRPs in Casana and Wilkinson (2005b, 25–30).

- 8 The updated number of sites counted within the AVRП is 355 (Gerritsen et al. 2008, 242, 295–96).
- 9 See also the field season reports from 2004 to 2008 available at the website of the expedition (http://www.imf.csic.es/esp/dptos/proyectos/siria/en/fieldwork_reports.html).
- 10 For details on the use of CORONA satellite imagery and remote sensing applications within the SHR Project see Donoghue et al. (2002); Philip, Donoghue, et al. (2002); Beck et al. (2005); Beck et al. (2007); Wilkinson, Beck, and Philip (2006); Galiatsatos, Donoghue, and Philip (2008).
- 11 According to Philip and Bradbury (2010, 141), the term “cairn” is used instead of tumulus because the funerary purposes should not be assumed for all cairns in the NSA.
- 12 For the geoarchaeological survey and the paleoenvironmental and climatic studies see Cremaschi, Trombino, and Sala (2002), Cremaschi et al. (2003), Cremaschi (2007a; 2007b), Trombino (2007), Valsecchi (2007), and Cremaschi, Morandi Bonacossi, and Valsecchi (2008).
- 13 Geophysical prospections were also conducted at Al-Rawda (Gondet and Castel 2004).
- 14 For a specific study on the exploitation of the microregion of Al-Rawda for agricultural and pastoral practices see also Barge et Moulin (2008).
- 15 See a more detailed bibliography on this project in Gatier, Geyer, and Rousset (2010, 11–16).
- 16 For a geographical and environmental description of the area of investigation see Besançon and Geyer (2006) and Jaubert et al. (1999).
- 17 For an overview on the history of the surveys in the Orontes valley and its surroundings see Fortin (2007b, 15–16).
- 18 A geographical description of the Ruj basin, with a first map of the sites according to the toponyms and the previous research in this area, is in Besançon and Geyer (1995, 335–43).
- 19 For an overview on the history of research in the Idlib region, see Mazzoni (2011a, 31–34).
- 20 No specific publications are currently available on this project. For some basic information see the webpage of the project (<https://www.topoi.org/group/a-i-6/>).
- 21 The sites recorded in 1977 were actually thirty-four (Matthers et al. 1978, 119), but the Citadel of Aleppo was listed as a unique site together with Tell es-Soda and Tell Aqabe. Moreover, Tell Rifaat was also not included in the inventory.
- 22 For further details on the history of research in this area see Wilkinson (2007a, 39–40) and Wilkinson et al. (2007, 214–15).
- 23 The Turkish side of the site of Karkemish is currently the object of a long-term investigation program by a joint Turco-Italian expedition under the direction of Nicolò Marchetti (Bologna University) and Hasan Peker (Istanbul University) (see more in Marchetti et al. 2012).

NO.	REGION	TEAM	YEAR	SURFACE (km ²)	SITES
1	Islahiye	Waechter	1949	n/a	16
		Alkim	1955–1972	2,500 ^a	68
2	Amuq	Braidwood ^c	1936	1,200 ^a	178
		Wilkinson ^c	1995–2002	1,200 ^a	346
3	Ugarit	Saadé	early 1960s	900 ^a	43
4	Jebbleh	Riis-Thuesen	1958–1963	132 ^b	55
		Saadé	early 1960s	n/a	12
5	Akkar	Saadé	early 1960s	n/a	11
		Al-Maqdissi, Thalmann	1986–1987	900 ^a	28
		Bartl	1997	900 ^a	41
6	Homs Gap	Al-Maqdissi, Haïdar-Boustani, J.J. Ibáñez ^d	2004–2005	560 ^b	132
7	Homs	Philip ^c	1999–Present	580 ^b	ca. 300
8	Qatna	Morandi Bonacossi	1999–2004	500 ^b	25
9	Al-Rawda	Castel ^f	2005–2006	100 ^b	30
10	Steppe	Geyer	1999–2002	7,000 ^b	ca. 1,000
11	Middle Orontes Hama	Bartl, Al-Maqdissi	2003–2007	600 ^b	175
12	Middle Orontes Ghab	Fortin	2004, 2006	500 ^b	39
13	South Ghab	Courtois	1970	50 ^a	27
14	North Ghab	Courtois	1970	100 ^a	15
15	Ruj	Courtois	1970	150 ^a	16
		Iwasaki	1990–1992	150 ^a	33
16	Jazr	Ciafardoni	1985–1986	1,250 ^b	22
		Shaaath	mid-1980s	n/a	17
		Mazzoni	1987–1999	7,000 ^a	20
17	Aleppo	Kohlmeyer	2010–Present	3,000 ^b	-
18	Jabbul	Maxwell Hyslop	1939	n/a	114
		Schwartz	1996	1,500 ^a	144
19	Quweiq-Rifaat	Matthers	1977–1979	1,300 ^a	68
20	Sajur	Moore; Copeland ^g	1977; 1979	1,250 ^b	76
21	Karkemish	Algaze	1989	n/a	ca. 100
		Wilkinson	2006–Present	450 ^b	79
22	Oylum	Özgen	2000	1,250 ^b	65
23	Gaziantep	Archi, Pecorella, Salvini	1970	10,000	216

Table 11.1 a) Surface approximately calculated according to the limits of each survey area; b) Surface refers to the area as reported in the specific publication; c) Count refers only to sites with unquestionable chronology; d) Count does not include the megalithic monuments; e) Count does not include the cairns; f) Count refers only to the settlements (Castel et al. 2008, 37, fig. 15). Tombs (509), kites, enclosures, and other archaeological evidence are not included; g) See § 2.19, note 21 above.

PART 3
Textual Evidence

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CHAPTER 12

DEFINING THE *CHORA* OF EBLA

A Textual Perspective

M.G. Biga

1. TOPONYMS IN TEXTS OF THE EBLA ARCHIVES AND RELATED PROBLEMS¹

Thousands of toponyms occur in the texts from the Ebla archives of the third millennium B.C. It was immediately clear, from the very beginning of Eblaite studies, that Eblaite scribes (like many other Near Eastern scribes) used the determinative ^{ki} to indicate very different realities: large fortified cities, capitals of kingdoms (which were named after their capital cities),² smaller fortified settlements, important secondary centers of the Eblaite kingdom or other kingdoms, small towns without fortifications, villages, and palatine farms situated around the city of Ebla or in the region controlled by Ebla. In the Eblaite texts there is no logogram to indicate the name of a region or a country (such as the determinative ^{kur} that was used by Mesopotamian scribes to indicate a foreign country), nor did the Eblaite scribes distinguish between *uru* (city) and *kur* (country); they indicate all the toponyms with the generic determinative of place, ^{ki}.

Some texts list a great number of toponyms. For example, the great treaty between the cities of Ebla and Abarsal (ARET XIII 5) cites dozens of toponyms, which refer to places that belonged to the commercial networks of the two capital cities. These places are said to be “in the hands” of the king of Ebla or of Abarsal; the formula used by the Eblaite scribes clearly indicates that they were linked to Ebla and Abarsal by commercial ties but were not part of the Eblaite country. The treaty defines the commercial zones of the two

capital cities, specifying the extension of their respective commercial networks. However, so far it has not been possible to locate with certainty the city of Abarsal itself and most of the cities mentioned in the text, apart from Karkemiš. Abarsal was probably situated on a river, probably the Euphrates, but it has not yet been identified with any of the numerous large tells of Upper Syria or Upper Mesopotamia.

A few letters written to the Eblaite kings also contain several toponyms—for example, the letter that the king of Mari, Enna-Dagan, wrote to his Eblaite counterpart, mentioning the victorious military campaigns of his predecessors on the throne of Mari (ARET XIII 4). Many cities are said to have been destroyed by the Mari kings; most of them were probably located along the Euphrates, some even in Ebla's territory. Ebla was forced to pay a heavy tribute of gold, silver, and oil to Mari for several years. Almost all of the toponyms mentioned in this letter, however, have not been identified with certainty.

Finally, among the texts kept in the Ebla archives there is also a geographical list; it contains many toponyms, but it is a text of the Mesopotamian school copied by Eblaite scribes, and its geographical horizon is probably the Mesopotamian rather than the Eblaite region (Pettinato 1978).³

Most of the Eblaite texts are administrative documents recording outgoing and, to a lesser extent, incoming goods—especially textiles,

metals, and metal objects. They are laconic and use stereotypical verbal forms, omitting much information that could be useful to us. At first sight, these administrative documents could appear somewhat monotonous and far less interesting than other kinds of documents, such as royal inscriptions, which were normally used for propaganda purposes. There are no royal inscriptions in Ebla. However, these seemingly dull administrative documents have been of vital importance in writing the history of the kingdom of Ebla and of other kingdoms of Syria or Upper and Central Mesopotamia in that period, and have proved to be far richer and fuller of information than many so-called historical documents. The records refer to deliveries of goods made to individuals of towns and cities of the Eblaite kingdom or of other kingdoms; this is why there are so many toponyms in the Ebla texts. After a delivery was registered, Eblaite scribes often also noted the related occasion, such as an important event at the Eblaite court or at other courts. Based on a long work of reconstruction of the relative chronology of the concise Eblaite administrative documents (Biga 2003c), it has been possible to write the political, diplomatic, and commercial history of Ebla and of a number of kingdoms of Syria and Upper Mesopotamia (Biga 1995; 1998; 2003d; 2010a; 2010b; 2010c; Archi 1998b; Archi and Biga 2003; Matthiae 2008a).⁴

Several kingdoms independent from Ebla but in close relationships with it have been recognized (Bonechi 1990). For some of them, like Mari, Emar, Nagar, and Ḫarran, it was possible to reconstruct dynasties of kings so far scarcely known or completely unknown. Most kingdoms mentioned in the Eblaite documents had as maximum political authority a king called *en* like the king of Ebla. In other regions, especially to the northeast of the Eblaite kingdom, the maximum political authority appears to have been called *badalum*. Centers like Ḫarran, Sanapzulum, and Iritum had a *badalum* at their head; these cities were independent from Ebla, even though they had solid ties with it (Otto and Biga 2010). Some small kingdoms had an official called *ugula* at their head. The term

ugula, translated “superintendent” (as it was used in Mesopotamia), seems to indicate in some cases an independent ruler or the maximum authority of tribal groups in the region of Ebla.

Administrative texts allow us to reconstruct thirty-six years of a series of annual military campaigns conducted by the Eblaite army. Many toponyms are mentioned in these types of texts, because the scribes followed the army in its itinerary and registered the deliveries of textiles during the military campaign. Most toponyms in these texts are related to towns outside the Eblaite *chora*, which are often mentioned only on the occasion of the military campaign. Sometimes it is possible to reconstruct the itinerary of the army to reach the foreign country, as for example in the case of the military campaign against Mari (Archi and Biga 2003).

All the toponyms in the published texts from Ebla were collected in two volumes of repertoires in 1993 (Bonechi 1993; Archi, Piacentini, and Pomponio 1993). Additional toponyms are to be added after the subsequent publication of volumes of the series ARET and of parts of texts published in articles. However, hundreds of new toponyms are found in still unpublished texts.⁵ In fact, during the last years of the kingdom of Ebla, the Eblaite political, diplomatic, and commercial horizon was very vast, and many new cities were mentioned for the first time in texts dating to this period, especially in those dealing with military campaigns. As usual the most productive texts, also for toponyms, are the administrative texts that deal with deliveries of textiles. They mention many toponyms because the deliveries of textiles took place not only in Ebla itself, but also in other towns of the region or in different kingdoms during Eblaite military campaigns or on other occasions. They are also very useful to define the Eblaite *chora*, where part of such deliveries took place.

Apart from some well-known kingdoms such as Alalah, Emar, Ḫarran, Mari, Nagar, Karkemiš and Kiš, whose homonymous capital cities have been identified with certainty with modern tells, the greatest part of the kingdoms

mentioned in the Eblaite texts are not precisely located. Considering all these problems, it is not surprising that of the two repertoires of toponyms from the Eblaite texts, one (ibidem) is without a map, whereas in the other (Bonechi 1993) only a few cities of certain identification have been put on the map.

2. CITIES, TOWNS, AND VILLAGES OF THE *CHORA* OF EBLA AND RELATED PROBLEMS

If it is difficult to locate the kingdoms of Syria and Mesopotamia at the time of the Ebla archives, it is even more difficult to define the borders of the kingdom of Ebla and to know how many cities and towns it contained, which ones were directly controlled by the king of Ebla, how many villages were around Ebla, and if there were also palatine farms in the country as we know there were in later Syrian kingdoms such as Ugarit. However, texts are a mine of information also in this regard, although these questions have so far attracted little attention, research having mainly focused on the reconstruction of the history of Ebla, Syria, and Upper Mesopotamia in the third millennium B.C.⁶

Several toponyms have already been recognized as belonging to the Eblaite *chora*. All these cities, towns, and villages are documented by a conspicuous number of texts from different archives. We are collecting all the data relating to every single city or village and ordering them in a chronological sequence in order to verify the economic and productive activities in these centers of the kingdom during the forty-five years documented by the archives. This work is still in progress, and we are preparing a series of articles about the most attested cities and villages of the Eblaite *chora*. Here are some examples, for some typologies of centers, of the documentation at our disposal, showing also the problems related to the study of these materials. Almost all of the examples are from unpublished administrative texts dealing with deliveries of textiles, usually referred to as MAT (Monthly Account of Textiles).

2.1. Royal Residencies

Among the cities that were surely part of the Eblaite *chora* there are those where the Eblaite kings had secondary palaces. Secondary residencies so far identified are: Arugadu/Larugadu, Azan, Lub, Mabarra and Madu (Biga 1987; 1991, 296–97; Tonietti 1989, 86–89).⁷

Women of the king (secondary wives) lived in these palaces. Princes and princesses were born there, and were entrusted to wet nurses like the royal princes born in Ebla itself (Biga 1997; 2000). Many events are cited as happening in these centers. It is sure that the king of Ebla spent some time in these palaces, where he also received foreign kings. This explains why, for example, several kings allied of Ebla used to come to the city of Mabarra all together (or at least in the same month) and receive precious textiles as gifts (MAT TM.75.G.2434+10280; see Biga 2008, 294; Ferrero, in this volume).

In the town of Arugadu (or Larugadu) there was a palace of the king and also an important and much venerated sanctuary of the god Adabal (^dNI-*da*-BAL/KUL);⁸ many texts (especially MAT) mention activities and deliveries that occurred there (see Ferrero, in this volume).

Women of the king were transferred with personnel from Ebla to secondary palaces. For example, text TM.75.G.1760+10130 (king Iš'ar-Damu, vizier Ibrium, month MA×GÁNA *tenû-egir*_x) reports that lady ANIla'aludu, a secondary wife of the king of Ebla, was sent to the palace of Arugadu at the beginning of the kingdom of the last king Iš'ar-Damu. Here she received textiles and was accompanied by servants, who received textiles too: 5 aktum-TÚG ti-TÚG 1 gada-TÚG hul A-NI-la-a-lu-du dam en du-du *si-in A-ru*₁₂-ga-du^{ki} 10 gu-mug-TÚG géme-géme-sù, "textiles to ANIla'aludu, woman of the king going to Arugadu, 10 textiles to her (10?) (female) servants" (TM.75.G.1760+10130 iii 8–iv 3). Several texts of later date attest that ANIla'aludu continued dwelling there (Tonietti 1989, 86).

Sons and functionaries of the king were also present in this town and received textiles there. For example, we learn from text TM.75.G.1703 (king Iš'ar-Damu, vizier Ibbi-Zikir [late], month *I-ba₄-sa*) that 1 aktum-TÚG dumu-nita en *A-ru₁₂-ga-du^{ki}* 1 íb-I-TÚG-gùn NI-a-lu ugula sur_x (ÉRIN) IGI.NITA en in *A-ru₁₂-ga-du^{ki}* šu-ba₄-ti, “1 textile for a son of the king: (received in) Arugadu, 1 textile for NIalu, the keeper of the couple of male donkeys (of the chariot) of the king: received in Arugadu” (rev. x' 1-11).

The king of Ebla had a secondary palace in the city of Azan that hosted a court and some women of the king, and where sons and daughters of the king were born by these women. The numerous texts mentioning this city also allow us to deduce that Azan also hosted storerooms where Eblaite textiles were kept and delivered on special occasions.

The role of Azan as a secondary residence of the last king Iš'ar-Damu at the time of vizier Ibrium is particularly evident in text TM.75.G.1794+3534 (= ARET III 469) (king Iš'ar-Damu, vizier Ibrium, month *I-sa-ri*). According to this document, the king received various kinds of textiles on the occasion of his trip to the city: 12 aktum-TÚG ti-TÚG 1 gada-TÚG šu-dag 1 gada-TÚG pad-sù en *si-in 'À-za-an^{ki}*, “12 aktum-textiles, 1 linen textile for the hands, 1 linen textile to cover..., for the king (going) to Azan” (viii 18–23).

Several additional texts refer to activities that took place in Azan or in other centers with royal palaces. Here are some examples:

1. TM.75.G.2431 (king Iš'ar-Damu, vizier Ibbi-Zikir, month *Ī-nun*) vii 3–15: 1,1 textiles SAG-Da-mu dumu-nita en in *'À-za-an^{ki}* šu-ba₄-ti 2,2 textiles *Ma-ga-da wa NE-ša-nu NE.DI A-da-bi-ik^{ki}*, “1,1 textiles to SAG-Damu, son of the king, received in Azan; 2,2 textiles for Magada and NEšanu, dancers of (the city of) Adabik.”
2. TM.75.G.2431 rev. i 4'–8': 2 *A-[da²-bi²-ik²]*^{rkiz} 3 *'À-za-an^{ki}* 2 *A-ru₁₂-ga-du^{ki}* 3 *Ma-du^{ki}* šu-ba₄-ti, “(textiles) for two (persons)

of A[dabik (?)], three of Azan, two of Arugadu, three of Madu: received.”⁹

3. TM.75.G.2445+3526 (= ARET III 463)+10029 (king Iš'ar-Damu, vizier Ibbi-Zikir, month lost) iv' 3'–10': 1,1,1 textiles *Ib-te-Da-mu A-ru₁₂-ga-du^{ki}* 1,1,1 textiles SAG-Da-mu *'À-za-an^{ki}* dumu-nita en, “1,1,1 textiles for Ibte-Damu: (received in) Arugadu; 1,1,1 textiles for SAG-Damu: (received in) Azan; both sons of the king (of Ebla).”
4. TM.75.G.2446+10045 (king Iš'ar-Damu, vizier Ibbi-Zikir, month lost) rev. ii 28–iii 2: 1 zara₆-TÚG 2 *bu-di* šú+ša bar₆:kù ì-giš-sag *Ma-za-a-du* [*'À-za*]-an^{ki} dam en, “1 textile, 2 silver pins (delivered) on occasion of the ceremony of purification of Maza'adu (in) Azan; (she is) a woman of the king.”
5. TM.75.G.2467 (king Iš'ar-Damu, vizier Ibrium, month lost) xiii 7–12: 1,1,1 textiles *Īr-péš-zé* ugula *Ga-ra-ma-an^{ki}* in *'À-za-an^{ki}* šu-ba₄-ti, “1,1,1 textiles for Irpeše, superintendent of (the city of) Garaman, received in Azan.”
6. TM.75.G.2501 (king Iš'ar-Damu, vizier Ibbi-Zikir, month lost) vi 14–vii 6: 1 gumug-TÚG 1 tur-sal níg-ba *Zi-ib-Da-mu* dumu-nita en *'À-za-an^{ki}* d^{li}-li-'à-ra, “1 textile, 1 object, gift of Zib-Damu, son of the king, (who lives in) Azan, for (the deity) Ili'ara.”
7. TM.75.G.2501 viii 7–10: *Zé-Da-mu* dumu-nita en *A-ru₁₂-ga-du^{ki}*, “Ze-Damu, son of the king, (in) Arugadu.”¹⁰

These cities, all in the Eblaite kingdom and possibly not too far from Ebla, have not yet been identified with specific tells of the region of Ebla; by collecting all the data relating to these toponyms, we hope to find elements useful to their identifications.

2.2. Cities Where Vizier Ibrium and Then His Son, Vizier Ibbi-Zikir, Had Secondary Palaces

Vizier Ibrium had a palace in Ebla itself and secondary residencies in cities of the Eblaite *chora*, such as Daraum, Dusigu, GitiNE, Šadab, and

Sadur. In these towns too there were storerooms controlled by the central administration from which textiles were delivered on different occasions and registered in the central archives of Ebla.¹¹ From these data it can be deduced that administration was centralized, and all the movements of goods from the storerooms of cities of the country were registered and kept in the central archives of the capital. For example, text TM.75.G.1794+3534 (= ARET III 469) (king Iš'ar-Damu, vizier Ibrium, month *I-sa-ri*) v 20–vi 16 records: 1 'à-da-um-TÚG-II 1 aktum-TÚG 1 íb-III-TÚG-sa₆-gùn *I-lul-za_x-Ma-lik in Da-ra-um^{ki}* šu-ba₄-ti 1 gu-dùl-TÚG 1 aktum-TÚG 1 íb-IV-TÚG-gùn *I-ti-A-gú* šu-i *Ib-ri-um* 1 sal-TÚG 1 íb-III-TÚG-gùn *Zú-du-du A-ra^{ki} Ti-ti-nu* šu-ba₄-ti *in Da-ra-um^{ki}*, “1,1,1 textiles for Ilulza-Malik, received in Daraum; 1,1,1 textiles for Iti-Agu, the barber of Ibrium, (and) 1,1 textiles for Zududu of (the city of) Ara: Titinu received (them) in Daraum.”

All these deliveries occurred in Daraum when Ibrium was there. The storerooms of Daraum were under the control of the central administration. Goods were possibly registered in a smaller tablet and then copied in a MAT that was kept in the main archive at Ebla. See, for example, TM.75.G.1704+3818 (= ARET III 738)+4835 (= ARET XII 501) xii 11–xiii 3: 1 sal-TÚG *Du-ri lú-kar Û-gul-za-du^{ki} in Sa-du-úr^{ki}* šu-ba₄-ti, “1 textile for Duri, merchant of (the city of) Ugulzadu, received in Sadur.”

Many other examples attest to the distribution of textiles in these centers to people of foreign courts in relationship with Ebla. See the following examples from text TM.75.G.1703 (king Iš'ar-Damu, vizier Ibbi-Zikir [late], month *I-ba₄-sa*):

1. rev. viii' 14–21: 2 íb-II-TÚG-gùn *Iš-má-Zi-ki-ri A-zú-gú-ra maškim Û-ti in Da-ra-um^{ki}* šu-ba₄-ti, “2 textiles Išma-Zikir and Azugura, maškim-functionaries of Uti, received in Daraum.”¹²
2. rev. ix' 9–17: 1 'à-da-um-TÚG-II 1 aktum-TÚG 1 íb-III-TÚG-sa₆-gùn *Ab-ri-A-ḥu Du-ub^{ki}* 1 aktum-TÚG 1 íb-TÚG-gùn *maškim Ti-šè-Li-im in Má-bar-ra^{ki}* šu-

ba₄-ti, “1,1,1 textiles for Abri-Aḥu of (the kingdom of) Dub, (and) 1,1 textiles for the maškim-functionary of Tiša-Lim, received in Mabarra.”

3. rev. x' 1–11: 1 aktum-TÚG dumu-nita en *A-ru₁₂-ga-du^{ki}* 1 íb-I-TÚG-gùn *NI-a-lu ugula sur_x(ÉRIN) IGI.NITA en in A-ru₁₂-ga-du^{ki}* šu-ba₄-ti, “1 textile for a son of the king: (received in) Arugadu, 1 textile for Nialu, the keeper of the couple of male donkeys (of the chariot) of the king: received in Arugadu.”
4. rev. x' 16–24: 3 gu-dùl-TÚG 3 sal-TÚG 3 íb-I-TÚG-gùn *La-NI-a-lum Ma-ga-du I-bi-ù NE.DI Gú-ra-kul in A-ri-gú^{ki}* šu-ba₄-ti, “3.3.3 textiles LaNialum, Magadu, (and) Ibiu, dancers of (the city of) Gurakul, received in Arigu.” (For the city of Arigu, cf. § 2.3.)

In conclusion, these centers were used not only for the private events of the court but also as delivery centers for textiles, both to people residing there and to foreign kings or court functionaries in relationship with Ebla. From this we can deduce that these centers were also places where textiles were possibly produced or at least stored in storerooms from which they were delivered on different occasions. We can suppose the presence of scribes also in these secondary centers, as well as of storeroom keepers. (See, for example, the deliveries registered in text TM.75.G.1703, which took place and are listed in the following order: in the city of Daraum, then Mabarra, then Arugadu, then Arigu. These are all centers of the Eblaite *chora*.)

2.3. Other Towns of the Eblaite *Chora* Where Textiles Were Delivered

Several other towns in which goods and especially textiles were delivered, often to people of foreign courts, seem to be part of the Eblaite *chora*. The list of these cities includes not only those where the kings of Ebla and the viziers had secondary palaces, but also such towns as Anmašu or Arigu, which appear to have been commercial bases, sort of *kārū* of the region of Ebla, from which textiles were distributed. Very often, textiles were

delivered not in Ebla itself but in other cities of the Eblaite region directly controlled by Ebla. We have collected hundreds of attestations in order to study all the activities that took place in these trade centers.¹³

2.4. Binaš/Nenaš and Darib: the Places Mentioned in the Ritual for Royalty and in the *kispum* Ritual (= ARET VII 150)

At least two holy places where rituals in honor of Eblaite deceased and divinized kings took place, Binaš (or Nenaš) and Darib, were surely part of the Eblaite *chora* (Archi, Piacentini, and Pomponio 1993; Bonechi 1993; Biga 2007–2008, 256–57; Ristvet 2011; Biga 2012, 11–12). The former is often mentioned in the texts, and these data can help to understand which rites were performed there. Darib is not frequently attested, which is strange for a place in which a cult of ancestors has been documented. Other attestations do not add any useful data to understand the nature of the place. See, for example, TM.75.G.1760+10130 (king Išar-Damu, vizier Ibrium, month MA×GÁNA^{tenû-egir_x}) ii 6–iii 7: 3 'à-da-um-TÚG 3 aktum-TÚG 3 íb-III-gùn-TÚG Ru₁₂-zi-Ma-lik lú Dam-da-Il wa Dab-bù-lum SA.ZA_x^{ki} wa dumunita A-zú-gú-ra Da-rí-ib^{ki} níg-AN.AN.AN.AN Û-ti šeš-II-ib in Ik-dar^{ki}, “3,3 textiles to Ruzi-Malik, the one of Damda-I(l), and Dabbulum, of the administrative complex (of Ebla), and the son of Azugura, of (the city of) Darib, who brought the news that Uti had become/was acting as a šeš-II-ib in Ikdar.” We cannot deduce any particular characteristic of the city of Darib from passages like this, which are common in the Eblaite texts. The city of Ikdar, occurring not very often, is surely part of the Eblaite *chora* too.

All the toponyms mentioned in the ritual of renewal of Eblaite royalty must be studied, because they are to be searched in the Eblaite *chora*. It is also necessary to reconstruct the trip of the royal couple and of the statues of the divine

couple Kura and Barama from Ebla and, after three periods of seven days, back to the city.¹⁴

2.5. Ḫalab (Modern Aleppo), a Sanctuary in the Eblaite *Chora*

It is possible to include in the Eblaite *chora* the center of Ḫalab, modern Aleppo (Bonechi 1993; Archi, Piacentini, and Pomponio 1993; Archi 2010c), which was already an important cultic center at the time of the archives, with a much-venerated temple of the storm-god Adad. From the texts it can be deduced that the center was not a big city, because there are not many movements of goods involving this place, but only deliveries to the sanctuary. Carpenters and smiths were sent to build or restore the temple.

2.6. Additional Sanctuaries in the Eblaite *Chora*

Cities such as Arugadu, Adani, and NIab, where fairs took place too, were important cultic centers (see Ferrero, in this volume). Zuramu, Uguaš, and MaNE, where three sanctuaries of the goddess Išhara are attested, also belonged most probably to the Eblaite *chora*. This goddess was much venerated by the kings of Ebla and also counted among her devotees the queen mother Dusigu and queen Tabur-Damu. The latter made several pilgrimages to these cities, visiting the three sanctuaries consecutively. The two sanctuaries of Arugadu and Luban, centers of the cult of the god Adabal, are to be searched in the Eblaite *chora* too. All these cultic centers deserve a long study.

2.7. Wells in the Eblaite *Chora*

Places where new wells were sunk are quite probably to be located in the Eblaite *chora*. The king often received news of a new well and gave some textiles in exchange for the news. Knowledge of the location of wells was of vital importance for merchants, travelers, messengers, and generals of the army, who needed to know where men and animals could drink and get supplies of water. A

network of wells existed in Ebla and its territory. Some places in which a new well was sunk have already been studied (Biga 2003b). We are collecting all the toponyms connected with wells in the texts of Ebla in order to understand which routes were used by merchants, messengers, and so forth.

2.8. *uru-bar*, “Outside the City” of Ebla

The texts call *uru-bar*, “outside of the city,” the territory outside the walls of Ebla, where some economic activities are documented. The big administrative part of the city, including the royal palaces, the storerooms, and some temples was probably named Saza (SA.ZA_x^{ki}; see, most recently, Archi 2009).¹⁵ Several anonymous dyers, men, and women, also with their children, were sent from Ebla to the *uru-bar* to work. In fact, a large area and large quantities of water were necessary to dye the wool (Biga 2010d, 152–53). These groups of dyers were composed of around twelve or thirteen people and they received textiles as payment for their work.

Many MAT mention these groups working outside.¹⁶

Big quantities of jars of oil were stored in the *uru-bar*, as emerges from ARET VII 148, which registers 7000 jars of oil in the “outside” of Ebla and 4000 jars in the Saza. This is proof that an intensive cultivation of olive trees was practiced around Ebla, exactly as documented for Ugarit of the second millennium B.C. (Liverani 1975; 1979; 1999; 2005, 131–33).¹⁷

2.9. Villages of the Eblaite *Chora*

A large number of villages, attested in several texts of the Great Archive (L.2769), but especially in the still unpublished texts of Trapezoidal Archive L.2764, were in the Eblaite *chora*.¹⁸ No political authority is attested in connection with these centers, and they seemed to be dependent on the central administration of the capital. They regularly sent to the palace quantities of cereals,¹⁹ receiving also seeds. Some villages had specialized workers. Groups of smiths are attested in several

villages. See, for example, TM.75.G.1794+3534 (= ARET III 469) (king Išar-Damu, vizier Ibrium, month *I-sa-ri*) xii 18–xiii 9: 10 lá 1 gu-dùl-TÚG *Ar-si-A-ḥa Dam-da-Il Ba-du-rúm Iš-la-it NI-zi-ma-Il Ḥa-mu-sum Za-gú-lum La-li I-ti-d Rasap simug-simug Ga-sa*^{ki} (“9 textiles to 9 people, “smiths of (the village of) Gasa”).

2.10. Centers That Had at Their Head an *ugula*, “Superintendent”

The centers that had at their head an *ugula*, “superintendent,” were sometimes independent, sometimes part of the territory of the Eblaite *chora*, and the *ugula* was a functionary of the Eblaite administration. For example, there was an *ugula* in the city of Darum, which was surely in the Eblaite *chora* and housed a palace of the vizier; see TM.75.G.1708 (king Išar-Damu, vizier Ibrium, month *Ga-sum*) rev. xv 5–6: 1 gu-dùl-TÚG 1 sal-TÚG *ugula Da-ra-um*^{ki}. We have started to collect all the attestations of *ugula* followed by a toponym. From the complete documentation it will be possible to determine which “superintendents” operated in the Eblaite *chora* and to follow their lives and functions over time.

2.11. Centers Where Fairs Took Place

Several of the centers in which every year a festival for a deity took place are certainly to be located in the Eblaite *chora*. Some fairs took place in other kingdoms, such as Mari or Dub, but the greatest part of the fairs occurred in the Eblaite *chora*, and the palace of Ebla itself bought goods of different types, paying with wool (Biga 2002; 2003a). All the places where fairs took place must be collected.

2.12. Toponyms Connected with the Name of a *lugal*, “Lord”

The rank of the official called *lugal* in the Eblaite administration remains ambiguous (see Archi 2000). It is quite possible that the toponyms connected with the name of a *lugal* refer to towns belonging to the region of Ebla and directly controlled by the Eblaite central administration.

In fact all the lugal brought goods of different types, which were then kept in the storerooms of Ebla. The mu-DU texts are records of these goods.

3. CONCLUSIONS

It is difficult to determine the real extension of the Eblaite kingdom and of the Eblaite *chora* during the forty-five years covered by the archives. After a victorious military campaign against a bordering kingdom, the enemy territory could have been assimilated into a new enlarged state. After a series of apparently victorious military campaigns conducted by Eblaite armies over thirty-six years, certainly the area directly controlled by Ebla was considerably enlarged (surely beyond the central economic *chora*, which however may also have shifted).²⁰ Some cities appear to have become part of the state of Ebla and were governed by an Eblaite official. At the end of the archives period, the Eblaite kingdom was quite vast and many new cities are mentioned in the texts. A complete study of all the military campaigns and their itineraries can help us understand the extension of the territory directly controlled by Ebla at the end of the archives age, when Ebla appears to have been at the height of its power.

NOTES

- 1 I am much grateful to Paolo Matthiae and Frances Pinnock for supporting me in studying unpublished texts from the Royal Archives of Ebla.
- 2 The kingdom of Ebla itself took its name from its capital city, Ebla. Similarly, many modern Arabian countries were named after their capitals: for instance, Syria (from the Arabic name of Damascus), Tunisia, Algeria, and so forth. I thank Fabrizio Pennacchietti who reminded me of this.
- 3 The geographical list of Ebla has been recently studied, discussed in detail, and compared with other geographical lists of different periods (with important results) by Camille Lecompte in his PhD dissertation (discussed at the University of Paris-Versailles in 2009).
- 4 Contemporary Mesopotamian texts, for example those from Lagaš, have permitted to reconstruct the

internal administration of the city, but not its political and diplomatic history.

- 5 For example, in text TM.75.G.1703 (king Iš'ar-Damu, vizier Ibbi-Zikir [late], month *I-ba₄-sa*) rev. vii' 10-15: 2 gu-mug-TÚG 2 aktum-TÚG 2 íb-IV-TÚG-gùn *Kùn-na-dš-da^{ki} Û-ru₁₂-gá^{ki} in Kùn-na-dš-da^{ki} šu-ba₄-ti*, "2,2,2 textiles to (one person of the city of) Kunnašda and to (one person of the city of) Uruga, received in Kunnašda." Both these cities are not listed in the published repertories of toponyms.
- 6 One of the main aims of the Ebla Chora Project is to try to define the real extension of the Eblaite kingdom, how many cities and towns were part of it, and the way in which the territory around Ebla was used, combining archaeological and epigraphic sources.
- 7 It was quite normal for a king of the ancient Near East or of Egypt to have a palace in the capital and other, secondary palaces in other cities of the kingdom. This has been true of all the oriental courts for millennia. Also the kings of Mari of the second millennium B.C. (who played an important role in the history of the region around 1810–1760) had secondary residences in the cities of Terqa, Saggaratum, Dur-Yakhdun-Lim, and Qatṭunan (Ziegler 1999, 12–15). Not too differently, the Savoy dynasty in Italy (1600–1900 A.D.) had a royal palace in the capital, Turin, and several other palaces around Turin where the court was temporary transferred during summer and where the king moved often during the year. Such centers as Stupinigi, Venaria, Moncalieri, Rivoli, and Racconigi hosted castles and palaces that were property of the Savoy dynasty. These royal dwellings were all around Turin, at a distance of a maximum 30 km (we must bear in mind that they travelled in horse-drawn carriages). Similarly, the Bourbon dynasty, of the Kingdom of the Two Sicilies, had a palace in the capital Naples and several other palaces at Portici, Capodimonte, and Astroni, all located around the capital, in Naples *chora*, and the wonderful palace of Caserta at 31 km from Naples. They also had, as the Savoy and other dynasties, several farms where the king and members of the royal family could spend some time hunting, etc. These farms were called "tenute," as, for example, the "tenuta di San Leucio." The same was true of the great dynasties of France and of the court of Vienna and other modern courts. Such comparisons of ancient oriental monarchies with monarchies and courts of modern times have been the subject of many discussions among scholars of modern history, from which emerges that the courts of 4000 years ago had many similarities with the courts of the

modern age. For instance, many similarities have been observed between the festivals held in oriental courts in different periods and those held at Versailles and Vienna (Duindam 2003; Biga 2011b).

- 8 For this deity and his sanctuary in Arugadu and other sanctuaries in other cities, see Pomponio and Xella (1997, 256–88).
- 9 Note the mention of three cities where the king of Ebla had a palace.
- 10 Ze-Damu was a well-known prince.
- 11 For deliveries in these towns, see Biga 2009b; Ferrero, in this volume.
- 12 Uti was a son of vizier Ibrium.
- 13 For a list of these cities and several examples, see Ferrero, in this volume.
- 14 For the texts of the ritual, see ARET XI. For different interpretations of the ritual, see Pettinato (1993), Matthiae (2008a), Biga (2003c), and Ristvet (2011).
- 15 For the city in the ancient Near East, see Liverani (1997; 1998; 2011), van de Mieroop (1997), and Dolce (2011).
- 16 See, for example, TM.75.G.1703 (king Iš'ar-Damu, vizier Ibbi-Zikir [late], month *I-ba₄-sa*) rev. xiii' 26–28: 12 gu-dùl-TÚG 12 íb-III-gùn dar-dar uru-bar. See also TM.75.G.1794+3534 (= ARET III 469) (king Iš'ar-Damu, vizier Ibrium, month *I-sa-ri*) 8–19: 14 gu-dùl-TÚG 14 sal-TÚG 14 íb-III-gùn-TÚG dumu-nita dumu-nita ur₄ dar gu-dùl-TÚG 12 íb-III-gùn-TÚG dumu-nita dumu-nita dar uru-bar *wa Ti-ra-Il wa I-šar* lú túg-du₈.
- 17 The possibility that the numerous é (“house” in Sumerian) listed in some texts were palatine farms such as the *bītū* (“houses” in Akkadian) of the Syrian city of Ugarit, studied by Liverani, should be considered.
- 18 For example, in text TM.75.G.986 of the Trapezoidal Archive L.2764, the villages of Šè-la-du^{ki}, Ša-na-ru₁₂-gú^{ki}, A-rí-mu^{ki}, DIB-nu^{ki}, NE-a-ú^{ki}, and DUB-ru₁₂^{ki} (which are also attested in texts of the Great Archive) are mentioned as producers of cereals.
- 19 For a study of cereals in the Ebla texts, see Marchesi, in this volume.
- 20 For example, in the case of the rebellion of an ally, the king of Kakmum, a coalition of kings went to war with vizier Ibrium; they cut the barley of Kakmum but on the road to Kakmum they conquered some villages or small towns. The verb used means “to conquer, destroy,” but it is quite possible that those settlements became part of the Ebla territory (they are mentioned in later texts on some occasions; see Biga 2008, 314–15).

CHAPTER 13

DISTRIBUTION AND EXCHANGE OF GOODS IN THE *CHORA* OF EBLA

G. Ferrero

1. INTRODUCTION¹

The administrative documents from Ebla (ca. 2400–2350 B.C.) reveal an intense circulation of goods that were issued by the central administration of the Eblaite state. The annual accounts of metals (henceforth: AAM) and the monthly accounts of textiles (henceforth: MAT), which were kept in the central archive of Royal Palace (Great Archive L.2769; see Archi 1986a, 79–81; 1996; Biga and Pomponio 1990; 1993), attest to frequent disbursements of metal objects and cloths or garments. These texts contain annual or monthly summaries of assignments of various kinds of textiles (Sallaberger 2009, 20; Biga 2010d) and precious metals—mostly in the form of specific artefacts with a standard weight (Milano 1991; Mander 1995; Maiocchi 2010).

The outgoing goods served a plurality of purposes; they were issued as:

1. Exchange goods;²
2. Payments to officers and personnel of the Eblaite administration for their services;
3. Gifts for high-ranking personages of other kingdoms with whom the Eblaite administration maintained diplomatic relations.

In many cases, such allocations of goods were registered as occurring in places other than Ebla or the places of origin of the consignees, as is indicated by the following administrative formula:

good(s) PN (title/profession and/or GN₁) in GN₍₂₎ šu-ba₄-ti

1. “good(s) (for) PN; he took it/them in GN.”
2. “good(s) (for) PN, the ... (title/profession); he took it/them in GN.”
3. “good(s) (for) PN, (a citizen) of GN₁; he took it/them in GN₂.”
4. “good(s) (for) PN, the ... (title/profession), (a citizen) of GN₁; he took it/them in GN₂.”

The Sumerian verbal form šu ba₄-ti, “he received,” was used in Ebla as a logogram for *laqāḫum*, “to take” (Marchesi, pers. comm.).³ When this specific term is linked to a toponym by the Semitic preposition *in*, it indicates the place in which the movement of a certain good or set of goods terminated, that is, where the sent goods were delivered to their intended recipients.

The study of the occurrences of the Sumerogram šu-ba₄-ti in connection with toponyms in texts from the periods of office of the viziers Ibrium and Ibbi-Zikir⁴ reveals that such transfers of goods occurred in a limited number of centres, which presumably belonged to the territory of Ebla. The toponyms that most frequently occur in the formula *in* GN šu-ba₄-ti are Adani, Ammašu, Azam/n, Daraum, Dusigu, Larugadu, Mabarra, Madu, NIab, and Sadur.

2. ADANI (ATANNI)

Goods from the central administration of Ebla were frequently delivered in the town of Adani

(*'Ā-da-ni*), an important cultic centre of the Eblaite region, probably to be identified with the Atanni that is found in texts from Alalakh (see Bonechi 1993, 19–20 s.v. AdaNI). Possibly located in the (upper?) Orontes region (Bonechi 1991, 71), Adani was a place of worship of the god Rašap and his spouse Adamma. The religious relevance of Adani explains the presence there of the mother of the king of Ebla and of high-ranking personages from foreign kingdoms, such as Tiša-Lim, queen of Emar, and the queen of NIrar with her daughters. After their arrival in the Eblaite kingdom, all these people received goods in Adani, presumably in a local palace of the king of Ebla, in which such important guests could dwell during their visits:

1. TM.75.G.10135 (MAT; king Iš'ar-Damu – vizier Ibrium) vi 12–17: (1 textile) *ama-gal en in 'Ā-da-ni^{ki} šu-ba₄-ti* “(for) the mother of the king;⁵ she took it in Adani.”
2. TM.75.G.10210 (AAM; king Iš'ar-Damu – vizier Ibrium, year 17) rev. viii 19–27: (textiles) *Ti-šè-Li-im ma-lik-tum Ī-mar^{ki} in ud du-du mi-nu 'Ā-da-ni^{ki}* “(for) Tiša-Lim, queen of Emar, when she left Adani.”
3. ARET VIII 541 (= MEE 5, 20) (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir) xxii (= rev. viii) 7–14: (textiles) *Ré-ì-Da-mu dumunita en Ī-mar^{ki} in 'Ā-da-ni^{ki} šu-ba₄-ti* “(for) Rei-Damu, son of the king of Emar; he took them in Adani.”
4. TM.75.G.2432+1989 (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir; month *Za-'à-tum*) xi 8–15: (1 textile) *ma-lik-tum NI-ra-ar^{ki}* “(for) the queen of NIrar,” (textiles) 4 *dumu-mí-sù* “(for) her four daughters”; *in 'Ā-da-ni^{ki} šu-ba₄-ti* “they took them in Adani.”⁶
5. ARET III 815 rev. i 1–6: (something) *dumu-mí en NI-ra-ar^{ki} in 'Ā-da-ni^{ki} šu-ba₄-ti* “(for) the daughter of the king of NIrar; she took it/them in Adani.”

Seasonal fairs (KI:LAM₇) took place in Adani during the cultic celebrations in honor of the god Rašap in the month of the deity ^dAMA.RA (third month of the calendar). On these occasions, silver or wool was distributed to

emissaries of the Palace and foreign visiting officials for buying goods:

6. TM.75.G.1382 (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir; month *Za-'à-tum*) rev. ix 2–9: (wool) *níg-sa₁₀ giš'ád é en En-na-Il šu-ba₄-ti KI:LAM₇ 'Ā-da-ni^{ki} lú ^dAMA.RA* “(for) the purchase of *ád*-wood (for) the king's palace;⁷ Enna-Il took it; (for) the fair of Adani, (in the month) of AMA.RA” (quoted by Biga 2002, 285).
7. TM.75.G.2622+ (AAM; king Iš'ar-Damu – vizier Ibbi-Zikir, year 7) x 12–21: (silver) *níg-ba Šu-ga-du* “(as) a gift for Šugadu”; (silver) *Wa-ru₁₂-tum* “(for) Warutum”; *in 'Ā-da-ni^{ki} šu-ba₄-ti šè ^dAMA.RA* “they took it in Adani for (the fair of the month) of AMA.RA” (quoted by Archi 1999c, 149).⁸

During the same festivals, goods were delivered to foreign dignitaries who had come to attend the religious ceremonies:

8. MEE 12, 36 (AAM; king Iš'ar-Damu – vizier Ibbi-Zikir, year 10) xv 12–24: (metal objects) *Ti-ša-Li-im ma-lik-tum Ī-mar^{ki} in 'Ā-da-ni^{ki} lú ^dAMA.RA šu-ba₄-ti* “(for) Tiša-Lim, queen of Emar; she took them in Adani, (in the month) of AMA.RA.”

3. AMMAŠU

Ammašu was a town in the Ebla region, probably to the south of Ebla (Bonechi 1993, 40 s.v. Ammašu). Like Adani, Ammašu probably hosted a royal estate, as we can infer by the presence of dignitaries from foreign kingdoms:

9. ARET IV 11 (MAT; king Iš'ar-Damu – vizier Ibrium) i 7–12: (textiles) *I-nu-ut-Da-mu ugula Kak-mi-um^{ki} in Am₆-ma-šu šu-ba₄-ti* “for Inut-Damu, superintendent of Kakmium; he took them in Ammašu.”
10. ARET IV 12 (MAT; king Iš'ar-Damu – vizier Ibrium) ix 18–x 4: (textiles) *en NI-ra-ar^{ki} in Am₆-ma-šu šu-ba₄-ti* “(for) the king of NIrar; he took them in Ammašu.”

4. AZAM/N

The term šu-ba₄-ti is also frequently found in connection with the town of Azam/n. The presence of the sons and daughters of the king of Ebla (with their wet nurses [ga-du₈] and servants) in this centre, which was probably situated to the north-west of Ebla (ibidem, 64 s.v. Azan, Azam) is recorded in several documents (see Biga and Pomponio 1990, 189 with n. 20; Archi, Piacentini and Pomponio 1993, 136–38; Biga 2000, 74). Among the recipients of goods in Anzam/n is also the Eblaite prince SAG-Damu:

11. TM.75.G.2431 (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir; month Ī-nun) viii 3–9: (textiles) *Sag-Da-mu* dumu-nita en in 'Ā-za-AN^{ki} šu-ba₄-ti “(for) SAG-Damu, the son of the king; he took them in Azam/n.”⁹

It is very likely that Azam/n hosted a royal harem. Many of the king's women (dam en) are mentioned in association with Azam/n (Archi, Piacentini, and Pomponio 1993, 138). Among these, Maza'adu is often recorded as a recipient of precious goods in Azam/n, together with her brother:

12. TM.75.G.2640+2641+2642 (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir) rev. iv 1–6: (textiles) *Ma-za-a-du* dam en in 'Ā-za-AN^{ki} šu-ba₄-ti “(for) Maza'adu, the king's woman; she took them in Azam/n.”¹⁰
13. TM.75.G.2439+ (MAT; king Iš'ar-Damu – vizier Ibbi-zikir) rev. iii 6–13: (textiles) šeš *Ma-za-a-du* dam en in 'Ā-za-AN^{ki} šu-ba₄-ti “(for) the brother of Maza'adu, the king's woman; he took them in Azam/n.”

The presence of a treasury (*LAK* 384 = za_x; see Civil 1983, 236) of the king in Azam/n suggests that many of the goods delivered by the central administration were meant to be stored in that town, which was probably the seat of a royal estate (Biga 1991, 296):

14. TM.75.G.10159 (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir) iii 4–13: (textiles) *Ma-wa-gi wa Iš₁₁-ga-um* 2 šu-mu-tak₄ za_x en

in 'Ā-za-AN^{ki} šu-ba₄-ti “(for) Mawagi and Išgaum; two shipments (to) the treasury of the king; they took them in Azam/n.”

15. ARET VIII 532 (= MEE 5, 12) (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir; month MA×GĀN*Atenû*-sag) rev. vii 20–viii 7: (textiles) *Dam-da-Ī* šu-mu-tak₄ za_x en in 'Ā-za-AN^{ki} šu-ba₄-ti “(for) Damda-I(l); shipment (to) the treasury of the king; he took them in Azam/n.”

5. DARAUM

Daraum is frequently mentioned in association with members of the royal family and the vizier Ibrium. In fact, both the king of Ebla and the vizier had estates in Daraum (see Bonechi 1993, 94 s.v. Dara'um). Distribution of goods to high-ranking personages (from both Ebla and other kingdoms) and foreign merchants is attested there:

16. TM.75.G.10160 (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir; month *Gi-NI*) rev. i 4'–10': (textiles) *Iš-al₆-Da-mu* dumu-nita en in *Da-ra-um*^{ki} šu-ba₄-ti “(for) Iš'al-Damu, son of the king; he took them in Daraum.”
17. TM.75.G.10273 (MAT; king Iš'ar-Damu – vizier Ibbi-Zikir; month *Za-lul*) rev. ix 2–8: (textiles) *Iš-al₆-Da-mu* dumu-nita en in *Da-ra-um*^{ki} šu-ba₄-ti “(for) Iš'al-Damu, son of the king; he took them in Daraum.”
18. TM.75.G.2456 (MAT; king Iš'ar-Damu – vizier Ibrium) x 19–xi 12: (textiles) dumu-nita en *Kak-mi-um*^{ki} é *Ib-rí-um* šu-ba₄-ti “(for) the son of the king of Kakmium; he took them in the palace of Ibrium; (textiles) dumu-nita en *Kak-mi-um*^{ki} é en šu-ba₄-ti “(for) the son of the king of Kakmium; he took them in the palace of the king (of Ebla).”¹¹
19. TM.75.G.2468+2484 (MAT; king Iš'ar-Damu – vizier Ibrium) x 6–13: (1 textile) *Ne-šè-Da-ar* lú-kar *Ša-ra-bí-ik*^{ki} in *Da-ra-um*^{ki} šu-ba₄-ti “(for) Neše-Dar, merchant of Šarabik; he took it in Daraum.”

6. DUSIGU

Goods were frequently delivered also in the town of Dusigu, an important agricultural and commercial centre of the region of Ebla (see *ibidem* s.v. Dušig). Dusigu, which was presumably named after the homonymous mother of the king, probably hosted a royal estate with a royal treasury. Members of the royal personnel received goods there:

20. ARET IV 25 (MAT; king Išar-Damu – vizier Ibrium; month *Ḫa-li*) rev. i 3–8: (textiles) *Du-ḫu-na-še* muḫaldim in *Du-si-gu*^{ki} šu-ba₄-ti “(for) Duḫunaše, the cook; he took them in Dusigu.”
21. ARET I 15 (MEE 2, 2) (MAT; king Išar-Damu – vizier Ibbi-Zikir; month *Ig-za*) rev. vii 11–18: (textiles) *A-ba-ù* šu-mu-tak₄ za_x en in *Du-si-gu*^{ki} šu-ba₄-ti “(for) Abau; shipment (to) the treasury of the king; he took them in Dusigu.”

7. LARUGADU

Larugadu, or Arugadu,¹² probably situated in the plain of Antioch, was one of the principal towns of the Eblaite kingdom, administered by a superintendent (ugula) (*ibidem*, 217 s.v. Larugadu). Besides being one of the major centres of the cult of the god ^dNI-*da*-BAL/KUL and his spouse ^dbe-mí, “the lady” (presumably an appellative of the goddess Išḫara), Larugadu probably housed a palace of the king of Ebla (see Biga 1991, 296). This is suggested by the fact that many important personages such as the king’s sons (with their wet nurses), women of the royal harem, and high officials, as well as foreign rulers, envoys, high officials, and courtesans of other kingdoms are frequently mentioned in connection with this town:

22. ARET I 2 (MAT; king Išar-Damu – vizier Ibbi-Zikir; month MA×GÁNA^{tenû}-egir_x) rev. v 16–23: (1 textile) ga-du₈ dumu-nita en *A-ru*₁₂-ga-du^{ki} in *A-ru*₁₂-ga-du^{ki} šu-ba₄-ti “(for) the wet nurse of the son of the king; (shipment to) Larugadu; she took it in Larugadu.”

23. ARET I 7 (MAT; king Išar-Damu – vizier Ibbi-Zikir) rev. xiii 15–20: (textiles) en *Kak-mi-um*^{ki} in *A-ru*₁₂-ga-du^{ki} šu-ba₄-ti “(for) the king of Kakmium; he took them in Larugadu;” xv 15–21: (1 textile) *Sa-mi-um* ugula sur_x-BAR.AN en in *A-ru*₁₂-ga-du^{ki} šu-ba₄-ti “(for) Samium, the king’s superintendent of the charioteers (?);¹³ he took it in Larugadu.”

Many other individuals with connections with the royal court of Ebla frequently received goods in the town of Larugadu for their services or as rewards for bringing important news (níg-mul(-an); see Sallaberger 2003) to this place. A few documents suggest that a treasury of the king was also present there:

24. ARET I 5 (MAT; king Išar-Damu – vizier Ibbi-Zikir; month *Za-lul*) rev. vi 3–9: (textiles) en *si-in A-ru*₁₂-ga-du^{ki} *Na-am*₆-Ḫa-lu ugula za_x šu-ba₄-ti “(for) the king (of Ebla), (shipment) to Larugadu; Nam-Ḫalu, the superintendent of the treasury,¹⁴ took them.”
25. ARET I 2 (MAT; king Išar-Damu – vizier Ibbi-Zikir; month MA×GÁNA^{tenû}-egir_x) rev. iv 6’–13’: (1 textile) *En-na-Ī* šu-mu-tak₄ za_x en in *A-ru*₁₂-ga-du^{ki} šu-ba₄-ti “(for) Enna-I(l);¹⁵ shipment to the treasury of the king; he took it in Larugadu.”
26. MEE 2, 39 (MAT; king Išar-Damu – vizier Ibbi-Zikir; month MA×GÁNA^{tenû}-egir_x) xiii 6–13: (1 textile) *A-ù* šu-mu-tak₄ za_x en in *A-ru*₁₂-ga-du^{ki} šu-ba₄-ti “(for) Ayyu; shipment to the treasury of the king; he took it in Larugadu.”

8. MABARRA

A secondary palace of the king of Ebla was probably located in Mabarra (Bonechi 1993, 226–27 s.v. Ma’barra), as is also suggested by the contemporary presence of the principal allied kings:

27. TM.75.G.2434+10280 (MAT; king Išar-Damu – vizier Ibrium) ii 14–iii 16: (textiles) en *Ra-’à-gu*^{ki} en *Bur-ma-an*^{ki} en *Ī-mar*^{ki} en *Lum-na-an*^{ki} en *Du-ub*^{ki} en *Gār-mu*^{ki} in *Má-*

bar-ra^{ki} šu-ba₄-ti “(for) the king of Ra’ak, the king of Burman, the king of Emar, the king of Lumnán, the king of Dub, (and) the king of Garmu; they took them in Mabarra” (quoted by Biga 2008, 294).

10. MADU

Madu is another town linked to the Ibrium’s family (see Bonechi 1993, 229 s.v. Madu(m)). A few women of the royal harem (Tonietti 1989, 86; Biga 2000, 79) and Eblaite officials receive goods in this locality:

28. ARET I 7 (MAT; king Iš’ar-Damu – vizier Ibbi-Zikir) rev. xiv 3–9: (textiles) *ì-giš-sag Ru₁₂-zú-Ī ugula sur_x-BAR.AN in Ma-du*^{ki} šu-ba₄-ti “(for) the purification ceremony of Ruzu-I(l), the superintendent of the charioteers; he took them in Madu.”

10. NIAB

Nlab was another important cultic centre, connected with the god Gamiš. The town was ruled by a superintendent (ugula) and, like Adani and Larugadu, was the site of seasonal fairs (Biga 2002, 279; 2003a, 63).¹⁶ The probable presence of a palace of the king of Ebla in Nlab can be inferred by the attestations of a royal treasury, from which goods were distributed to internal personnel and to important guests:

29. ARET I 10 (= MEE 2, 17) (MAT; king Iš’ar-Damu – vizier Ibbi-Zikir; month *Ha-li*) rev. ix 20–x 3: (textiles) *Ba-ti* šu-mu-tak₄ za_x en in NI-ab^{ki} šu-ba₄-ti “(for) Bati; shipment (to) the treasury of the king; he took them in Nlab.”
30. TM.75.G.2507 (AAM; king Iš’ar-Damu – vizier Ibbi-Zikir, year 11) xviii 7 (objects) 1 dumu-nita en *Za-bur-rúm*^{ki} in NI-ab^{ki} šu-ba₄-ti “(for) one of the sons of the king of Zaburru; he took them in Nlab.”
31. TM.75.G.1249 (MAT; king Iš’ar-Damu – vizier Ibbi-Zikir; month *Za-’a-tum*) rev. iv 24–v 8: (textiles) *I-du-NI-i-du Su-i-du Da-da I-da-Ī* Kiš^{ki} lú gi₄ *mi-nu níg-kas₄ Ar-mi*^{ki} “(for)

IduNI’idu, Suidu, Dada, Ida-I(l), (citizens) of Kiš who returned / were returning from the military expedition against (the city of) Armi; (textiles) *Kiš^{ki} in NI-ab^{ki} šu-ba₄-ti* “(for the citizens of) Kiš; they took them in Nlab” (quoted by Biga 1998, 18).

Besides the mention of the princess Tište-Damu, who received precious jewels for the birth of her son in Nlab (Archi 2002), various texts attest to the presence of the royal court in this place.¹⁷

11. SADUR

Like Daraum, Sadur was linked to the royal court and Ibrium’s family. In the case of Sadur, the administrative documents clearly record the presence of estates belonging to the king and the vizier.¹⁸ Considering the presence of secondary palaces belonging to the highest authorities of the kingdom, finding deliveries of goods in this town does not come as a surprise:

32. ARET IV 12 (MAT; king Iš’ar-Damu – vizier Ibrium; month *I-rí-sá*) x 5–13: (textiles) *Ru₁₂-zi maškim GIBIL-Ma-lik* šu-mu-tak₄ nin-uš^{mušen} in *Sá-du-úr*^{ki} šu-ba₄-ti “(for) Ruzi, the *maškim*-functionary of GIBIL-Malik, (for) the shipment of an eagle (?); he took them in Sadur.”

Many other localities are attested as sites for the delivery of goods from the central administration to courtesans, officials, and members of the Palace’s personnel, as well as to foreign visiting personages.¹⁹ However, the administrative documents do not provide sufficient elements to establish the specific role of these centres within the territory or the possible presence of properties of the king or other high-ranking officials of the kingdom.

NOTES

- 1 I would like to thank Paolo Matthiae, Frances Pinnock, and Maria Giovanna Biga for allowing me to quote from unpublished texts.
- 2 Eblaite “merchants” received silver from the central administration to buy products outside the Eblaite territory (Archi 1998b, 8–10; 2005a; Milano 2003;

- Milano and Parise 2003, 48). In addition, during the local fairs (KI:LAM_x), Eblaite officials received silver (and sometimes wool) to purchase other commodities (mainly raw materials and products for the dyeing of textiles see Biga 2002; 2003a; 2011, 85–89).
- 3 Note the expression GN šu-ba₄-ti, “to take, conquer GN” (Biga 2008, 312–19; Archi 2010b, 16; Toni-
etti 2010, 65). For a unique occurrence of a form of *laqāḥum* in syllabic orthography in the Eblaite texts, see ARET XI 1 i 2, with comment ad locum (Marchesi, pers. comm.).
 - 4 In the texts dating to Ibrium’s predecessor, Arrugum, the formula *in* GN šu-ba₄-ti almost never occurs (the only example of which I am aware is ARET XV 20 iii 11–15: 1 tūg-NI.NI 1 íb-III-gùn *Du-ub*^{ki} *in* IGI^{ki} šu-ba₄-ti).
 - 5 ama-gal at Ebla is just a variant spelling of ama, the logogram for “mother,” and should not be translated as “great mother” (Marchesi, pers. comm.).
 - 6 For additional attestations of the queen of NI-*la/ra-ar*^{ki} as a recipient of goods in Adani, see Archi, Piacentini, and Pomponio (1993, 127).
 - 7 For ^{gis}ád, see Conti 2003, 123. This kind of wood or plant was usually bought by emissaries of the Eblaite administration to be used for the king’s palace. See, for example, ARET I 13 (= MEE 2, 7) rev. x 15–19: 10 KIN siki ^{gis}ád é en *En-na-ni-Il* šu-ba₄-ti; ARET XII 856 (textile allocations): 5 KIN siki níg-sa₁₀ ^{gis}ád é en; TM.75.G.10045+2446 rev. iii 9’–12’: 6 KIN siki níg-sa₁₀ ^{gis}ád é en.
 - 8 Both Šugadu and Warutum were emissaries of Mari (Archi 1999c, 148–52).
 - 9 The presence of prince SAG-Damu in Azam/n is also attested by TM.75.G.2445+3526+10029 (MAT; king Iš’ar-Damu – vizier Ibbi-Zikir) rev. iv 6–10: (textiles) Sag-*Da-mu* ’Ā-za-AN^{ki} dumu-nita en “(for) SAG-Damu; (delivered in) Anzam/n; (he is) the son of the king.”
 - 10 For other examples, see ARET I 2 (MAT; king Iš’ar-Damu – vizier Ibbi-Zikir; month MA×GĀN*Atenú-egir*_x) rev. v 7–13; ARET IV 1 (MAT; king Iš’ar-Damu – vizier Ibbi-Zikir; month *Gi-NI*) ix 23–x 2. For further occurrences of Maza’adu in association with Azam/n, see ARET III 776 rev. i and Toni-
etti (1989, 86).
 - 11 The palaces of Ibrium and of the king of Ebla that are referred to in this passage were probably located in Daraum; see TM.75.G.2456 rev. xii 17–22: (textiles) *I-sar* KÍD-sag é *Ib-ri-um* *Da-ra-um*^{ki} “(for) Iš’ar, the doorkeeper of the palace of Ibrium in Daraum.”
 - 12 The name of this GN was written either *A-ru*₁₂-*ga-du*^{ki} or, in early documents, *La-ru*₁₂-*ga-du*^{ki} (see Toni-
etti 1989, 114–15). The former spelling presumably reflects the palatalization of the initial *l* of Larugadu, which was probably pronounced as *y* (Toni-
etti 1992). The name has been interpreted by Fronzaroli (1984–1986, 144) as *Lāruggatum.
 - 13 In rendering the title ugula sur_x-BAR.AN en as “the king’s superintendent of the charioteers” we follow Archi (1998b, 10). Milano (1990, 47) instead renders ugula sur_x-BAR.AN as “soprintendente della pariglia di (equidi-)BAR.AN.”
 - 14 This official is also mentioned in ARET III 527 rev. i, again in association with Larugadu.
 - 15 For this official, who in some documents bears the title lú za_x, “the one (in charge) of the treasury,” see Archi, Biga, and Milano (1988, 286).
 - 16 The fairs of these three localities are mentioned together in MEE 12, 36 rev. xvi 12–xvii 6.
 - 17 See, for example, TM.75.G.1559 viii 4–8: *in* ud en du NI-*ab*^{ki} “when the king (of Ebla) went to NIab.” Also note the presence of the queen of Emar in Nlab, recorded in MEE VII 34 (AAM dating to the fourteenth year of Ibrium) (see also Archi, Piacentini, and Pomponio 1993, 400).[
 - 18 See ARET VII 154 ii 8–11: é en *in* *Sa-du-úr*^{ki}; and MEE 10, 2 xii–rev. i 4: é *Ib-ri-um* *in* *Sa-du-úr*^{ki}. The estate of Ibrium was administered, at least for a period, by Ibrium’s son, Irti.
 - 19 Here is a list of additional toponyms that occur in the clause *in* GN šu-ba₄-ti: ’Ā-*da-du*^{ki}, ’Ā-*ma-ad/du*^{ki} (= Hamatu, modern Hama; see Archi 2010a); ’Ā-*nu-ga-ad/du*^{ki}, *A-a-su*^{ki}, *A-ba-ad/du*^{ki}, *A-bi-la/ra-du*^{ki}, *A-da-ti-ig/gú*^{ki}, *A-la*^{ki}, *A-te-na-ad/du*^{ki}, *A-ḥa-sum*^{ki}, *A-ri-gú*^{ki}, *A-ša-lu-gú*^{ki}, *Bar-ru*₁₂^{ki}, *Bar-ga-u*₉^{ki}, *Bù/Bu*₁₄-*zu-ga*^{ki}, *Da-bi-na-ad/du*^{ki}, *Da-lum*^{ki}, *Da-na-NE*^{ki}, *Da-ri-ib*^{ki}, *Da-ti-gú*^{ki}, *Du-ne-éb*^{ki} (= Tunip, modern Tell Asharneh; see Archi 2010a), *Du-u*₉^{ki}, *Dur-NE-du*^{ki}, *Ga-ba-ga-NE-du*^{ki}, *Ga-ma*^{ki}, *Gi-ti-NE*^{ki}, *Ḥa-lab*_x (LAM)^{ki} (= Ḥalab), *ḤAR-ba-ad/du*^{ki}, IGI^{ki}, *Maš-ga-du*^{ki}, *Mu-si-lu*^{ki}, *NE-a-ù*^{ki}, *NI-rúm*^{ki}, *NI-za-ar*^{ki}, *Sal-ba-ad/du*^{ki}, *Ša-ra-bi-ig*^{ki}, *Ša-ša-ra-nu*^{ki}, *Ū-du-ḥu-du*^{ki}, *Ūr-lu*^{ki}, *Zam*_x-*ba*₄^{ki}, *Zàr-ad*^{ki}, *Zi-ig*^{ki}, and *Zu-gur-lum*^{ki} (for references see Archi et al. 1993 s.vv.). Most of them were presumably within the borders of the territory controlled by Ebla.

CHAPTER 14

OF PLANTS AND TREES

Crops and Vegetable Resources at Ebla

G. Marchesi

1. INTRODUCTION¹

Eblaite administrative documents from the Royal Archives of Ebla (ca. 2350 B.C.) deal mostly with cloths, garments, metals, and metal products. No less a scholar than Gelb (1986) maintained that the main sources of Ebla's prosperity were the manufacture and trade of textiles and metal objects, and that agriculture, cattle breeding, and the exploitation of natural resources were economic activities of secondary and only limited importance. Gelb (1986, 164) observed that "at Ebla, the size of the agricultural area is relatively small... [T]he land produced grain barely sufficient for local consumption, but allowed the extensive raising of sheep and a surplus of wool (and much less goats' hair) and a production of textiles that were exported to foreign countries." On the basis of the case studies of Ebla, in northern Syria, and Lagaš, in southern Mesopotamia, Gelb (1986, 165) came to some general conclusions about the development of early civilizations, namely that:

1. Higher forms of civilization were achieved in early historical times on account of the leisure that indirectly resulted from the production of surpluses of two kinds of commodities: grain in the case of Lagaš and Babylonia, wool in the case of Ebla and northern Syria.
2. The native availability of such natural resources as stone, timber, and metals played no role or only a very limited role in the destiny of early civilizations.

Gelb's views were partly challenged by Steinkeller. According to Steinkeller (2004), Ebla derived most of its wealth from the overland trade in timber, in spite of the fact that only very rarely do Eblaite texts mention deliveries or expenditures of timber.² Steinkeller explains the relative silence of the written sources on this score as a consequence of the timber trade not having been the object of a narrow administrative focus at Ebla.³ In his view, Ebla controlled one or more of the overland timber trade routes between the Mediterranean and the Euphrates⁴ and gained much profit by collecting taxes on the transport of timber through its territory.⁵ Finally, Steinkeller suggests that such tree by-products as cedar oil, resins, and acorns were probably also "of great economic significance" for the Eblaite trade.

Considering the vast extent of its territory, which stretched from the Ghab and the plain of Antioch in the west to Karkemiš and beyond in the northeast (see Archi 1989a; 2006a; 2010a), it is quite possible that Ebla had direct access to most of these resources. Moreover, the occurrence, in certain documents, of very big numbers referring to areas of cultivated land or to amounts of stored grain and olive oil (see, most recently, Archi 2006b, 20–23)⁶ suggests that agriculture played a much more important role in Ebla's economy than Gelb thought. Unfortunately, although several publications have focused on the issues of agriculture, land management, and the organization of rural territory in ancient Ebla (Archi 1990a; 1991; 1992; 1998a; 2006b; Milano 1987a; 1996), the study of these topics

is still at a preliminary stage, partly because the vast majority of the agricultural texts are still unpublished and partly because our knowledge and understanding of the relevant lexicon is incomplete.⁷ The problem is even more acute in the case of husbandry, for which there are only a few pioneering essays (Butz 1981; Archi 1984; Milano 1984).

Clearly there is much preliminary work yet to be accomplished before we can attempt an extensive study of agriculture and husbandry at Ebla, and of the exploitation of Ebla's territory and resources. The present work is the first of a series of planned studies aiming at providing preparatory material for such an investigation. In particular, it offers a catalogue of the plants and trees that are attested in the archival texts from Ebla.⁸ Due to space constraints, however, only the first part of this work, dealing with field crops, is published here. Parts II and III, dealing respectively with fruit and garden crops (II) and trees, wild plants, and unidentified phytonyms⁹ (III) will appear in future publications.

Previous studies of botanical items focused mainly on the lexical materials provided by bilingual vocabularies (Zurro 1983)¹⁰ or on select classes or species of plant, such as olive (Archi 1991), cereals (Archi 1999a), alliaceous plants (Catagnoli 2007), grapevine, fig, apple (Catagnoli 2008), cumin, and thyme (Catagnoli 2010). No attempt has yet been made to provide an overview of all of the various vegetable taxa in the Eblaite texts. Needless to say, these data are essential not only for understanding the basis and mechanisms of the Eblaite economy, but also for reconstructing the vegetation, landscape, and environment of Ebla and neighboring areas.

In our catalogue of plants and trees, the following procedures and conventions are adopted:

1. Plant names are grouped into six groups: field crops, fruit, garden crops, trees, wild plants, and unidentified. Within each group, terms are listed in alphabetical order.
2. Obsolete or inaccurate readings of Sumerian logograms, which are found in previous scholarship, are cited in quotation marks.

Cross-references refer the reader to correct readings.

3. Departing from the customary conventions in Eblaite studies, Sumerian logograms that occur in texts written in the Eblaite language are transliterated here in CAPITALS, while Akkadograms (Semitic logograms) are written in *CAPITAL ITALICS*.¹¹
4. *Italic* (not capital) characters are used to transliterate syllabic writings of Semitic words and to transcribe Semitic words. Sumerian words are instead in spaced Roman characters.
5. Departing from another well-established custom in Eblaite studies, transcriptions of Eblaite words are not "etymological." So, for instance, written *š* is not transcribed as *q* or *t*, but rather as *š*; and written *s* is always transcribed as *ś*, regardless of the fact that etymology requires us to reconstruct *ś* as **ś* or **š*, depending on the word. In fact, the numerous examples of alternating *s* or *l* versus *š* in writings of the same words militate against the usual assumption that etymological **q*, **t*, and **š* were preserved in Eblaite.

2. FIELD CROPS

2.1. GÌB: "(naked) wheat" (a free-threshing cereal, possibly hard wheat)

Attested in ARET II 20¹² ii 4 and TM.75.G.1536 iv 6–v 1 and rev. v 1 (Archi 1986b, 195–97, plates III–IV; Pettinato 1986, 409–11, plate XXIV; 1991, 254–56). The latter text also mentions ZÍD GÌB, "wheat flour" (ii 6–iii 1, iii 5, and rev. viii 3–vii 1).¹³ For additional attestations of GÌB in unpublished texts, see Archi (1999a, 507, 511–13, quotations 4, 12, 17, and 19).¹⁴

Sumerian *gìb* (often misread as *gig*¹⁵) corresponds to Akkadian *kibtu(m)*, "wheat," which is traditionally regarded as a Sumerian loanword (Hrozný 1913, 62n2; Lieberman 1977, 254; Diakonoff 1981, 36). However, most recently Militarev (2005, 137–38) has persuasively argued for an Afrasian background

of this term.¹⁶ It is quite possible, therefore, that Sumerian gîb derived from Akkadian *kibtu(m)*, rather than the reverse.¹⁷ Be that as it may, there is no question that both words denoted some type of free-threshing wheat (Powell 1984, 56–58), and the same should also be true of the word that was written with the logogram GÌB in the Eblaite texts.¹⁸ In this connection, we might note that several archaeobotanical samples from the Early Bronze Age at Ebla contain grains of bread/hard wheat (*Triticum aestivum/durum*),¹⁹ and two samples also attest to the presence of some small-grained wheat (see Wachter-Sarkady, in this volume), which could be either club wheat (*Triticum compactum*) or the controversial *Triticum parvicoccum*.²⁰

Unfortunately, paleobotanical analysis does not allow for the exact identification of charred grains of naked wheat at the level of wheat species or subspecies (Kislev 1984, 10; Nesbitt 2001, 41–43). It is only possible to distinguish two types of grains, which may belong to two or more species or varieties of naked wheat: small spherical or semispherical grains (generally less than 5 mm long) and larger ellipsoidal grains (Renfrew 1984, 35). As for EBA Ebla, each of these types is represented by only a very small number of finds: eleven seeds of bread/hard wheat and ten seeds of small-grained wheat (Wachter-Sarkady, pers. comm.; see her contribution in this volume). It is very likely, however, that the species or the principal type of free-threshing wheat that was grown at Ebla was hard wheat,²¹ in spite of the fact that only a small number of seeds that may belong to this species have been retrieved.²² At any rate, the archaeobotanical data suggest that the cultivation of free-threshing wheat(s) was very limited, especially in comparison with such cereal crops as barley, emmer, and einkorn (see also s.v. GÌB.TUR).

2.2. GÌB.DAR: see GÌB.GÛNU

2.3. GÌB.DAR.TUR.GUR: see GÌB.GÛNU.TUR^{gur}

2.4. GÌB.GARIĜ.TUR: “flax, linseed”

Hapax legomenon occurring in TM.75.G.10142 ii 2 (see below, Appendix A).

Archi (1999a, 508) read GÌB.GARIĜ.TUR as “gig-ZÚM-tur” and interpreted it as “small wheat.” However, one should note the occurrence of the sign GARIĜ (“ZÚM”) in this compound logogram.²³ As Sumerian *gariĝ* means “comb,”²⁴ it is conceivable that GARIĜ here refers to the flax-rippling comb that was used to rid the flax stalks of their seeds,²⁵ or to some other toothed implement for the combing of flax fibers.²⁶ As regards the other two components of the logogram—GÌB and TUR—see note 39.

Although only few seeds dating to the EBA were found (see Wachter-Sarkady, in this volume), it is nonetheless a reasonable assumption that flax (*Linum usitatissimum*) was cultivated at Ebla in order to meet the needs of the Eblaite textile “industry” (Archi 1990a, 51–52). Administrative texts that record distributions of cloths often mention linen fabrics (or garments) that were very likely produced locally (see, most recently, Biga 2010d, 156–57). However, the sowing rate for flax that is provided by the seed-and-surface text TM.75.G.10142 compared with the sowing rates for barley in that and other tablets (see below, Appendix B) could suggest that flax was also grown for oil and/or seed consumption in the region of Ebla.²⁷ The attested rates for barley are about four times larger than that for flax; a difference this big is perhaps better explained by the use of a variety of oil flax and by a type of sowing for flax aimed to produce linseeds.²⁸

2.5. GÌB.GÛN: see GÌB.GÛNU

2.6. GÌB.GÛN.TUR.GUR: see GÌB.GÛNU.TUR^{gur}

2.7. GÌB.GÛNU

Attested in ARET IX 73 iv 4;²⁹ XIII 9 i 6; and TM.76.G.158 i 2 (quoted by Archi 1999a, 506, 512).

GÌB.GÛNU has been interpreted as “spotted *Triticum aestivum*” (ibidem, 512) or “frumento estivo macchiato” (Fronzaroli 2003, 94). However, cereals are not spotted unless they have some illness (Wachter-Sarkady, pers. comm.). In my opinion, GÌB.GÛNU is more likely an abbreviation of GÌB.GÛNU.TUR^{gur} (see s.v.).

2.8. GÌB.GÛNU.TUR^{gur}: “field pea” (?)

GÌB.GÛNU.TUR.GUR occurs several times in TM.75.G.1536 (Archi 1986b, 195–97, plates III–IV; Pettinato 1986, 409–11, plate XXIV; 1991, 254–56), an inventory of the surpluses of foodstuffs of king Yirkab-Dāmu. Here, in col. iv 1–4, we read: 50 GÛ.BAR GÌB.GÛNU.TUR.GUR / 5 GÛ.BAR ĜÊŠ.PA ba-rí-sa-tum / GÌB.GÛNU.TUR.GUR / 5 LA.ĤA ZÍD GÌB.GÛNU.TUR.GUR, “50 *kubārum*-vessels of G.,³⁰ 5 wooden *kubārum*-vessels of G.,³¹ 5 LA.ĤA-jars of G. flour.”³² The same amounts of GÌB.GÛNU.TUR.GUR and GÌB.GÛNU.TUR.GUR products are repeated in the totals at the end of the document (rev. vii 3–4 and v 3; cf. note 13).

In other texts the spelling GÌB.GÛNU.TUR.GUR is abbreviated as GÌB.GÛNU or GÌB.TUR.GÛNU (see s.vv.). This fact suggests that the logogram proper was actually GÌB.GÛNU.TUR, which could also be written as GÌB.TUR.GÛNU; the last sign, GUR, which can be omitted in writing, is very likely a phonetic complement that was meant to indicate how the complex GÌB.GÛNU.TUR should be read. If so, then the word in question began with /Gur/ (/G/ = /g/ or /k/ or /q/), and GÌB.GÛNU.TUR.GUR should properly be transliterated as GÌB.GÛNU.TUR^{gur}.

As for the identification of the referent of GÌB.GÛNU.TUR^{gur}, we may dismiss an earlier proposal by Pettinato (1986, 410–11; 1991, 255–56), who rendered “gig-dar-tur-gur”³³ as “miglio/millet;” there is no archaeobotanical evidence for the cultivation of millet not only at Ebla, but in the entire Near East, prior to the Late Bronze Age (Renfrew 1984, 38–39; Nesbitt and Summers 1988; van Zeist 1994, 546). Nor is there any sound philological argument for

this identification (cf. Stol 1993–1997). Archi (1999a, 512), on the other hand, considered GÌB.GÛNU.TUR^{gur} to be a variety of bread wheat and translated it as “small... *Triticum aestivum*.” In this connection, we should note that the above-cited text, TM.75.G.1536, distinguishes between three different types of GÌB: simple GÌB (iv 6–v 1), GÌB.TUR (v 4), and GÌB.GÛNU.TUR^{gur} (iv 1). In addition, in the final counting (rev. v 1–3) the respective amounts of these three items are kept separate: 1 *li-im* 1 *mi-at* GÛ.BAR GÌB / 7 GÛ.BAR GÌB.TUR / 50 GÛ.BAR GÌB.GÛNU.TUR^{gur}, “1,100 *kubārum*-vessels of wheat, 7 *kubārum*-vessels of GÌB.TUR, 50 *kubārum*-vessels of GÌB.GÛNU.TUR^{gur}.” Similarly, GÌB.GÛNU.TUR^{gur}, abbreviated as GÌB.GÛNU or GÌB.TUR.GÛNU, is accounted separately from GÌB and GÌB.TUR.TUR in TM.76.G.158 (quoted in ibidem, 512) and TM.75.G.1546 (ibidem, 511–12), respectively.

The following facts must therefore be considered in identifying the referent of GÌB.GÛNU.TUR^{gur} and variants: (1) it was regarded as a type of GÌB; (2) it was nonetheless distinguished from GÌB, “wheat,” and GÌB.TUR(.TUR); (3) flour (ZÍD GÌB.GÛNU.TUR^{gur}) was obtained from it; (4) its name begins with /gur/ or /kur/ or /qur/.

The crucial element for determining the proper identification of GÌB.GÛNU.TUR^{gur} is, in my view, the sign GÛNU. GÌB.TUR and GÌB.GÛNU(.TUR)/GÌB.TUR.GÛNU differ only in respect to the occurrence or non-occurrence of this element, which should thus be regarded as decisive. The sign GÛNU has two basic meanings, “(to be) split” (Sumerian *dar*) and “(to be) mottled, speckled, multicolored” (Sumerian *gùnu*), but neither of them makes much sense with reference to cereals (see s.v. GÌB.GÛNU). Wachter-Sarkady pointed out to me that attributes like “speckled, multicolored, split” apply more obviously to such pulse species as lentils.³⁴ However, pea seeds are also “split” and often mottled (van Zeist 1985, 35). Therefore, the mere fact of having “split” seeds cannot be the distinctive characteristic we are seeking, since it is true of both lentils and peas (and, for that matter, of bitter vetch too).³⁵ What is distinctive

must be the fact that either lentils or peas were mottled/speckled at Ebla. We can omit beans from consideration, since their number in the archaeobotanical record of Ebla is very low.³⁶ In contrast, both lentils (*Lens culinaris*) and field peas (*Pisum sativum*) are well attested in samples from the EBA (see Wachter-Sarkady, in this volume).

If one accepts that GÌB.TUR and GÌB.GÛNU.TUR^{gur} denoted pulse species rather than cereal types, as the occurrence of GÌB.TUR as a textual variant of GÚ.GÌB in ARET II 17 also suggests (see s.vv. GÌB.TUR and GÚ.GÌB), then another vexing problem is solved: the otherwise apparent lack of pulses in the epigraphic documentation from Ebla.³⁷ Pulses are present in the documentation, but we failed to recognize them, because the Eblaite scribes did not use the Sumero-Akkadian logograms for pulse names with which we are acquainted.³⁸

At this point, we need to establish which term—GÌB.TUR versus GÌB.GÛNU.TUR^{gur}—refers specifically to “lentil” versus “pea.” The referents of both GÌB.TUR and GÌB.GÛNU.TUR^{gur} were considered to be “small ‘wheat’ ” (GÌB.TUR),³⁹ but only one of them was “mottled/speckled” (GÛNU). We should also note that lentils are more common than peas among archaeobotanical finds (see Wachter-Sarkady, in this volume); the fact that the amount of GÌB.GÛNU.TUR^{gur} far exceeds the amount of GÌB.TUR in the inventory text TM.75.G.1536 (see above) could circumstantially support the interpretation of the former as the logogram for “lentil,” and of the latter as the logogram for “pea.” However, no single case may be considered decisive. Moreover, the evidence of etymology points to the opposite conclusion. To wit, the gloss ^{gur} to GÌB.GÛNU.TUR calls to mind the Semitic biliteral root GR, whose basic meaning is “being round and swollen,” that is, having a globular shape (Conti 1980, 63). Reduplicated forms of this base are attested in Arabic, Aramaic, and Hebrew in terms denoting such spherical fruits as “(ripe) olives” or “berries” (DRS 181, s.v. GRGR). At Ebla the related word *gurgurum/kurkurum*—variously written *gur-gú-ru*₁₂, *kur-gú-*

*ru*₁₂, or *kur-gur-ru*₁₂⁴⁰—signified a precious bead spherical in shape (Archi 2002, 191; Pasquali 2005, 142–45). Since other jewelry elements were also named after plant elements,⁴¹ it is tempting to suggest that *gurgurum/kurkurum*, in fact, means “pea,”⁴² and that the homonymous bead should be understood as “pea(-like bead).”

Finally, it remains to discuss the enigmatic term *ba-rí-sa-tum*, which occurs in connection with GÌB.GÛNU.TUR^{gur} in TM.75.G.1536 iv 2–3 and rev. vii 4 (see above). Pettinato (1998, 15) interpreted it as *parisātum*, assuming it means “cut stalks of plants” (see also Pettinato 1986, 410–11; 1991, 255–56). However, such an interpretation seems to be prevented by the writing itself of the word—the syllabogram *sa* being employed to write the phonem /ś/ at Ebla.⁴³ In my opinion, *ba-rí-sa-tum* more likely stands for *barriśātum*, meaning “(plant) pods.” This interpretation is suggested by the comparison with the later Akkadian term *barrišu*, which, on the basis of the lexical equation *bar-ri-šu* = *ku-šu* [...], in a first-millennium list of botanical terms (Köcher 1955, 9 no. 32b and dupls. iii 10), can be assumed to designate the pod of a plant.⁴⁴ If so, then *ba-rí-sa-tum* GÌB.GÛNU.TUR^{gur} should denote peas that had been stored in the form of pea pods rather than dry seeds.⁴⁵

2.9. GÌB.TUR: “lentil” (?)

Attested in ARET II 17 (= MEE 7, 19) v 4; IX 35 rev. ii 3; 73 iii 1' and iv 5; TM.75.G.1536 v 4 and rev. v 2 (see s.v. GÌB.GÛNU.TUR^{gur}). Also written GÌB.TUR.TUR (see s.v.).

GÌB.TUR has been interpreted as “small-grained wheat”—a designation for club wheat (*Triticum compactum*) (Archi 1999a, 506). A small-grained wheat (in comparison with the larger seeds of bread wheat or hard wheat) has indeed been found in two samples from EBA Ebla, but only a few grains of it have been identified (see s.v. GÌB). It is quite possible that this kind of wheat occurred at Ebla as a weed or that it was cultivated as an admixture in crops of bread or hard wheat (cf. Bor 1968, 203).⁴⁶

Be that as it may, textual evidence points in another direction. In ARET II 17, “40 *kubārum*-measures of GÚ.GÌB” (iv 4) are referred to in a first partial summary two-thirds of the way into the document as “40 *kubārum*-measures of GÌB.TUR” (v 4).⁴⁷ An additional “40 *kubārum*-measures of GÚ.GÌB” (vi 3) are then recorded (vi 3) and summed, at the end of the document, over and above the “40 *kubārum*-measures of GÌB.TUR” of the earlier partial summary. The final total sum (ŠU.NÍGIN) is noted as “80 *kubārum*-measures of GÚ.GÌB.” As Edzard (1981b, 51–52) already observed, GÌB.TUR and GÚ.GÌB here refer to the same commodity. Edzard thought that the commodity in question was “Weizen,” but “wheat” is GÌB alone (see s.v.). In my opinion, GÚ.GÌB is more likely a writing of the general term for “pulses” (see s.v.), in which case GÌB.TUR should denote a particular type of legume, possibly “lentils” (see s.v. GÌB.GÜNU.TUR^{gur}). In this connection, it should be noted that lentils were probably the legume par excellence at Ebla, judging from archaeobotanical finds (see Wachter-Sarkady, in this volume). It should come as no surprise, therefore, that they could be referred to simply as “pulses” (GÚ.GÌB) rather than by the more specific “lentils” (GÌB.TUR).

2.10. GÌB.TUR.DAR/GÜN: see GÌB.TUR.GÜNU

2.11. GÌB.TUR.GÜNU

Attested in TM.75.G.1546 rev. iv 4 and vii 3 (quoted by Archi 1999a, 506, 511–12).

According to Archi (1999a, 506), GÌB.TUR.GÜNU denotes a spotted variety of GÌB.TUR. In my opinion, however, GÌB.TUR.GÜNU, like GÌB.GÜNU, is probably just a variant spelling of GÌB.GÜNU.TUR^{gur} (see s.v.).

2.12. GÌB.TUR.TUR

Hapax legomenon occurring in TM.75.G.1546 vii 1 (quoted by Archi 1999a, 506, 512).

In all likelihood, GÌB.TUR.TUR is a variant spelling of GÌB.TUR (see s.v.).

2.13. “gig”: see GÌB

2.14. “gig-dar-tur-gur”: see GÌB.GÜNU.TUR^{gur}

2.15. “gig-gú”: see GÚ.GÌB

2.16. “gig-gùn”: see GÌB.GÜNU

2.17. “gig-gùn-tur-gur”: see GÌB.GÜNU.TUR^{gur}

2.18. “gig-tur”: see GÌB.TUR

2.19. “gig-tur-gùn”: see GÌB.TUR.GÜNU

2.20. “gig-tur-tur”: see GÌB.TUR.TUR

2.21. “gig-ZÚM-tur”: see GÌB.GARIĜ.TUR

2.22. GÚ.GÌB: “pulse”

Only attested in ARET II 17 (= MEE 7, 19) iv 4, vi 3, viii 2; and in *TLME* 21 rev. i 14' (lexical text).

While the editor of ARET II 17 interpreted GÚ.GÌB as “Weizen” (Edzard 1981b, 127),⁴⁸ Archi (1999a, 506) has more recently hypothesized that GÚ here might be an abbreviation of GÚ.NUNUZ,⁴⁹ which in Sumerian designated a variety of *zíz*, “emmer” (Powell 1984, 53–56). Should this be the case, however, one would expect GÚ.ZÍZ or ZÍZ.GÚ instead of GÚ.GÌB (cf. Bauer 1972, 133, comment to col. i 1, and 666 s.v. “*zíz*-GÚ.NUNUZ”).⁵⁰

In my opinion, the element GÚ of the compound logogram GÚ.GÌB is probably the same as Sumerian *gú*, “pulse,” and GÚ.GÌB (“pulse + wheat”) presumably represents an Eblaite variant of this Sumerian logogram (see s.vv. GÌB.GÜNU.TUR^{gur} and GÌB.TUR).

2.23. “gú-gig”: see GÚ.GÌB

2.24. *gurgurum: see GÌB.GÜNU.TUR^{gur}

2.25. *i-du* (= *ḫittū*): “grain, cereals” (plurale tantum)

See (1) ARET XIII 1 rev. x 13–xi 3: [*w*]a-a / [*i*]-ti / si-ma / É / 'a₅-si / a-la-mi-im, “And I carried the grain to the house (of the god?); it shall not be

filled with vermin;” and (2) ARET XVI 2 rev. iv 1–6: Uḫ / ŠE / *da-ga-ri-sa-am*₆ / *i-na* / *i-t[i]* / É *su-wa-ti-ma*, “The parasite of barley has certainly come to devour the grain of that house.”

In these two passages *i-ti* probably stands for *ḫittī*, the genitive-accusative of *ḫittū*. The editors of ARET XIII and XVI, Fronzaroli and Catagnoti, took *ḫittū* to mean “barley,” but the fact that both ŠE, the logogram for “barley,” and *i-ti* occur side by side in the same passage appears to undermine this interpretation. Eblaite *ḫittū* is more likely the general term for “cereals,” thus preserving the etymological meaning of Proto-Semitic **hint*-(at-), “edible grain,” as is also the case of its Akkadian cognate *uṭṭatu(m)* (see CAD U/W s.v.) and of some related words in other, more distant, Semitic and Afrasian languages (Diakonoff 1981, 35, 43–44; Kogan 2012, 246). See also s.v. ŠE.ŠE.

2.26. *i-ti*: see **i-du*

2.27. KAL: “einkorn”

Widely attested in administrative texts (see Archi 1999a, 508–9, 511–15).⁵¹

When the sign KAL denotes a foodstuff, it is usually read either “šik_x” or “sig₁₅”—a word that has variously been interpreted as “farina fine” (Pettinato 1974–1977, 11 and passim), “farina grossa” (D’Agostino 1996, 81–82), “Getreidesorte” (Edzard 1981b, 139), “a type of wheat” (Milano 1987a, 185), “wheat” (Van Lerberghe in Ismail et al. 1996, 120n3; Widell 2003, 724), or “einkorn” (Archi 1999a, 504–5). Before discussing the issue of the identification of the referent of KAL in the Ebla texts, the following facts should be pointed out:

1. Both the readings “šik_x” and “sig₁₅” have no basis and are most likely incorrect; in fact, a value šik_x for the sign KAL simply does not exist,⁵² while sig₁₅, or rather sag₈,⁵³ is the reading of KAL when it occurs as an adjective signifying “best, of first quality” or the like (said of beer, flour, grain, etc.).⁵⁴
2. At Ebla, KAL alone certainly denoted a cereal type and not a flour, as made clear, for

instance, in TM.75.G.2143 (Milano 1987a, 184–85; 1990a, 81) and TM.75.G.10142 (see below, Appendix A).⁵⁵

3. The same cereal is also attested at Tell Beydar (Ismail et al. 1996, no. 49 [pp. 146–47 and plate 23] i 4–ii 2; see also Widell 2003, 725–26), but in no other place.⁵⁶
4. By analogy with ZÍD GÌB, “wheat flour,” and ZÍD ZÍZ, “emmer flour” (see s.v. GÌB and ZÍZ, respectively), ZÍD KAL in the Ebla texts (Archi 1986b, 205; Milano 1990b, 410; etc.) is probably to be interpreted as “KAL-cereal flour,”⁵⁷ rather than ZÍD SAG₈/SIG₁₅, “first-quality flour.”⁵⁸

As for the identification of the cereal in question, we might note that the sign KAL has two basic meanings: “(to be) rare/valuable” (Sumerian kal) or “(to be) strong/hard” (Sumerian kalag). The latter meaning immediately calls to mind the name of hard wheat, which has indeed been identified at Tell Brak (see note 21), roughly 45 km to the west of Beydar.⁵⁹ Moreover, free-threshing wheat—be it bread wheat or hard wheat—was certainly the least common of the cultivated cereals and, for that reason, it was attributed a higher value than the other cereal crops (cf. Milano 1989, 217). However, the cereal that was written with the sign KAL appears to have been—together with ZÍZ, “emmer”—the second most important cereal in terms of attested quantities, both at Ebla and Beydar.⁶⁰ This datum fits poorly with the scanty finds of hard wheat at Brak and of bread/hard wheat at Ebla (see s.v. GÌB). According to paleobotanical data, the second or third most cultivated cereal species at both Ebla and Brak in the EBA was einkorn (*Triticum monococcum*).⁶¹ Since ŠE and ZÍZ almost certainly refer to barley and emmer, respectively, the conclusion that KAL denoted “einkorn” seems to be inescapable. The choice to use the logogram KAL for writing the word for einkorn might well be due to the fact that einkorn was considered to be “the strong one” of wheats, because it was highly resistant to drought conditions and was able to produce grain on poor soils where other wheat species were unable to grow (see Charles 1984, 25).⁶²

Various additional pieces of circumstantial evidence support an identification of the KAL-cereal of the Ebla and Beydar texts with einkorn. Einkorn, also known as small spelt, shares many similarities with emmer. Charles (ibidem, 25) pointed out that “[*Triticum monococcum*] is often sown as a mixture with *T. dicoccum*... and may then be harvested, processed and prepared for human consumption in the same ways as *T. dicoccum*.” Moreover, like emmer, it can be used in the manufacture of beer (Bor 1968, 206). If we look at textual evidence, we see that ZÍZ, “emmer,” and KAL-cereal are associated in the Vocabulary of Ebla (VE 1367'–1368') and were mixed together in the preparation of the BAPPIR beer ingredient.⁶³

The following observation by Bor (1968, 206) is also worth noting in this connection: “Though Percival affirms that the flour [of einkorn] makes a good flavored though dark brown bread, Rozhevits and Shishkin (1934) state that it is unsuitable for baking as it produces excessively crumbling bread.”⁶⁴ This fact could explain why the “KAL-cereal bread” (ÌNDA KAL) was not made of pure “KAL-cereal flour” (ZÍD KAL), but rather of a mixture of that flour with another cereal product called *saltum* (*za-la-tum*) (see Milano 1990b, 330).⁶⁵

Finally, it should be observed that the sowing rates for the KAL-cereal given in the Eblaite texts are considerably lower than those for emmer (ratios: 3:10 or 4:10; see below, Appendix B), as is usually the case with einkorn versus emmer.⁶⁶

The interpretation of KAL as “einkorn” perfectly accounts for the fact that this cereal is only found in texts from Ebla and Beydar. As Charles (1984, 35) explains to us, einkorn is “unsuited to large-scale cultivation under an irrigation regime due to its low yield.” In addition, einkorn grows better in cold climates and is virtually absent from, or extremely rare in, archaeological sites of very hot regions like southern Mesopotamia and Egypt (Wachter-Sarkady, pers. comm.; cf. Renfrew 1984, 32–33, 39–40).

2.28. *kurkurum*: see GÌB.GÛNU.TUR^{gur}

2.29. NE-*ti-gi*-LUM: see ŠE NE-*ti-gi*-LUM

2.30. “*sig₁₅*”: see KAL

2.31. ŠE: “barley”

Widely attested in administrative texts (see Archi 1999a, 506–9, 512–16).

The interpretation of Sumerian *še* (= Akkadian *e'yu(m)*, *û(m)*; see Cavigneaux 1989; Mayer in Beaulieu and Mayer 1997, 171–73) as “barley” is based on the preponderance of barley among the cereal crops of ancient Mesopotamia, according to archaeobotanical data (Helbaek 1960, 195; Jacobsen 1982, 18–20, 22–23, 25; Renfrew 1984), and the corresponding preponderance of *še* in texts, compared with other terms denoting cereal types (Jacobsen 1982, 24, 26–33; Powell 1984, 49; see also Maekawa 1984, 81). This appears to have been the case also at Ebla: among cereals, the one that is written with the logogram ŠE is by far the one found most frequently in texts and attested in the largest recorded quantities;⁶⁷ in addition, the number of charred grains of barley (species: *Hordeum vulgare*) that have been found in archaeobotanical samples far surpasses the number of grains of all the other cereals (Wachter-Sarkady, pers. comm.; see her contribution in this volume).

A few texts also distinguish between ŠE GÍGI, “black barley,”⁶⁸ and ŠE BABBAR, “white barley” (see s.vv.). Wachter-Sarkady (pers. comm.) suggested that “black barley” could be barley blackened by fire or heat. While this hypothesis remains a possibility,⁶⁹ the fact that Eblaite had other words for indicating parched or roasted barley calls for another explanation.⁷⁰ In this connection, Bor (1968, 246) noted that locally, in Iraq, different forms of *Hordeum distichum* “are often simply termed white, red or black barley.” Although Ebla’s barley was the six-rowed *Hordeum vulgare*, it is equally true that Ebla also bought and imported barley from other cities and countries (Archi 1999a, 506–7), and that the two-rowed *Hordeum distichum* was the

principal type of barley that was cultivated in upper Mesopotamia in the EBA (see Bottema and Cappers 2000, 52 and table 1; Charles and Bogaard 2001, 308 and table 33; Riehl 2001, 158–63). Therefore, it is tempting to suggest that “black barley” and “white barley” refer to two varieties of *Hordeum distichum* coming from outside Ebla’s territory.

2.32. ŠE BABBAR: “white barley” (probably a variety of *Hordeum distichum*; see s.v. ŠE)

Only attested in ARET II 21 iv 2 and TM.87.G.499 ii 3 (quoted by Archi 1999a, 513). Cf. ŠE GÍGI.

2.33. “še bar₆”: see ŠE BABBAR

2.34. “še gi₆”: see ŠE GÍGI

2.35. ŠE GÍGI: “black barley” (probably a variety of *Hordeum distichum*; see s.v. ŠE)

Only attested in ARET II 21 iv 1 and TM.87.G.499 ii 2 (quoted in ibidem, 513). Cf. ŠE BABBAR.

2.36. ŠE NE-ti-gi-LUM (?)

Hapax legomenon occurring in TM.75.G.156 iii 2 (Milano 1987a, 193; 1990a, 83).

Archi (1999a, 509) interpreted it as a variety or quality of barley.⁷¹ However, a reading ŠE.BIL ti-gi-núm, “the parched barley product (called) *diknum*,”⁷² might be proposed as an alternative.

2.37. ŠE.ŠE: =? *ḥiṭṭū*, “grain, cereals”

Attested in ARET VII 70 i 2; 82 rev. i 3; VIII 2 (= MEE 5, 2) rev. x 3; TM.75.G.1245 ix 20 (Archi 2005a, 13); and TM.75.G.3481+ rev. xv 14 (quoted by Archi 1999a, 507).

Although it cannot be demonstrated, ŠE.ŠE is almost certainly a writing of *ḥiṭṭū*, “grain, cereals” (see s.v. *i-du). The reduplicated form ŠE.ŠE

suggests that the term written with this logogram was in the plural, a fact that accords well with the above-mentioned interpretation—*ḥiṭṭū* being, in fact, a plurale tantum.

2.38. “šik_x”: see KAL

2.39. ZÍZ: “emmer”

Widely attested in administrative texts (see ibidem, 508–9, 511–16).

That the Sumerian term *zíz* means “emmer” was first suggested by Hrozný (1913, 55, 60–61) on the basis of the comparison of *kunāšū*, the Akkadian equivalent of *zíz*,⁷³ with the Aramaic *kunnātā*.⁷⁴ Hrozný (ibidem, 30) also correctly recognized that this related Aramaic word refers not to spelt (*Triticum spelta*), as was usually translated, but rather to emmer (*Triticum dicoccum*). That this is also the meaning of *zíz* is further confirmed by the lexical equation *zíz* = *ku-sú-m[u-ma]* in a multilingual vocabulary from Ras Shamra/Ugarit⁷⁵—Ugaritic *kussumūma* being a cognate of Hebrew *kusmet*, “emmer.”⁷⁶

It is very likely that the logogram ZÍZ denoted “emmer” at Ebla too. Emmer is well attested in archaeobotanical samples from the EBA (see Wachter-Sarkady, in this volume). The unique spelling ZÍZ.ZÍZ (ARET II 20 viii 2) suggests that the Eblaite word for “emmer” was probably a plurale tantum (cf. s.v. ŠE.ŠE) like the Akkadian *kunāšū* and the Ugaritic *kussumūma*.⁷⁷ According to the texts, “emmer” (ZÍZ) was ground into “emmer flour” (ZÍD ZÍZ; see TM.75.G.1383 iii 1 [Archi 1986b, 194 and plates I–II]; TM.75.G.1723 ii 3 [quoted by Archi 1999a, 511]; Milano 1990b, 410 s.v. “zì-zíz”) and was used to make beer (see above, s.v. KAL), several kinds of bread or cakes (see ibidem, 410 s.v. “zíz”), and an unidentified product called *ama-ug₅-ga* in Sumerian and *gi-ba-um* in Eblaite (ibidem, 378 s.v. “*ama-u₉-ga*”).

2.40. ZÍZ.ZÍZ: see ZÍZ

APPENDIX A. TM.75.G.10142 (FIGS. 14.1–14.8)⁷⁸

obv. i	1.	5 ŠE GÚ.BAR	5 <i>kubārum</i> -measures of barley
	2.	ŠE.NUMUN	(as) seed
	3.	70 GÁNA ^{ki}	(for) 70 “plots;” ⁷⁹
	4.	14 ½ ZÍZ GÚ.BAR	14 ½ <i>kubārum</i> -measures of emmer
ii	1.	1 MI 80 GÁNA ^{ki}	(as seed for) 180 “plots;”
	2.	1 GÚ.BAR 4 NÍĜ.SAĜ:ŠÚ GÌB.GARIĜ.TUR	1 <i>kubārum</i> -measure and 4 “helmets” of flax
	3.	65 GÁNA ^{ki}	(as seed for) 65 “plots;”
rev. i	(two or three cases broken)		
	1'.	[...] ṛ _x x (x) ṛ	[...]
	2'.	1 KAL GÚ.BAR	1 <i>kubārum</i> -measure of einkorn
	3'.	30 GÁNA ^{ki}	(as seed for) 30 “plots;”
	4'.	2 ŠE GÚ.BAR	2 <i>kubārum</i> -measures of barley
rev. ii	1.	23 [GÁNA ^{ki}]	(as seed for) 23 [“plots;”]
	2.	2 [...]	2 [<i>kubārum</i> -measures of...]
	3.	20[(+x) GÁNA ^{ki}]	(as seed for) 20[(+x) “plots.”]
	4.	[...] ṛ ^{ki}	(The village of) [...]
	5.	<i>bíl-za-i</i>	(Seed of) Pilsa'il.

APPENDIX B. SOWING RATES ACCORDING TO EBLAITE TEXTS

Three Eblaite texts—ARET II 51, TM.75.G.2143 (Milano 1987a, 184; 1990a, 81), and TM.75.G.10142 (see above, Appendix A)—provide us with information concerning sowing rates for cereals and flax at Ebla.⁸⁰ The first two of these documents contain both standard reference rates and actual rates, which do not always coincide. The relevant data are listed below; seed rates are expressed in number of “goblets” per one “plot,” that is, in Eblaite terms, in *assammū* (AN. ZAM_x) per *zitti'allum* (GÁNA^{ki}/GÁNA.KÉŠ^(ki)) (see notes 30 and 79).

a) Standard reference rates

ŠE, “barley”: $1 \frac{1}{2}$ NÍĜ.SAĜ:ŠÚ (ARET II 51 rev. ii 2; TM.75.G.2143 ii 5) = **7.5**⁸¹

ZÍZ, “emmer”: 2 NÍĜ.SAĜ:ŠÚ (TM.75.G.2143 rev. ii 2) = **10**

KAL, “einkorn”: 3 or 4*AN.ZAM_x (TM.75.G.2143 i 3 and ii 3*) = **3** or **4**

b) Actual rates

ŠE, “barley” (range: 7.5–10.43; average: 8.57)

1. TM.75.G.2143 ii 4-5: $(120 \times 1 \frac{1}{2})^{82} \div 24 =$
7.5
2. ARET II 51 rev. ii 1-2: $(120 \times 6 \frac{1}{2}) \div 100 =$
7.8
3. TM.75.G.10142 i 1-3: $(120 \times 5) \div 70 =$
8.57
4. TM.75.G.10142 rev. i 4'-ii 1: $(120 \times 2) \div$
 $23 =$ **10.43**

ZÍZ, “emmer” (range: 9.66–10; average: 9.83)

1. TM.75.G.10142 i 4-ii 1: $(120 \times 14 \frac{1}{2}) \div 180 =$
9.66
2. TM.75.G.2143 rev. ii 1-2: $(120 \times 2) \div 24 =$
10

KAL, “einkorn” (range: 3.35–4; average: 3.74)

1. TM.75.G.2143 i 1-3: $[(120 \times 2 \frac{1}{2}) + (5 \times 7)]$
 $\div 100 =$ **3.35**

2. TM.75.G.2143 ii 1-3: $[120 + (5 \times 4)] \div 36$
 $=$ **3.88**

3. TM.75.G.10142 rev. i 2'-3': $120 \div 30 =$ **4**

GÌB.GARIĜ.TUR, “flax”

1. TM.75.G.10142 ii 2-3: $[120 + (5 \times 4)] \div 65$
 $=$ **2.15**

NOTES

- 1 I would like to thank Paolo Matthiae, Principal Investigator of the Ebla Chora Project and Director of the Archaeological Expedition of the Sapienza University of Rome to Ebla, and Frances Pinnock, Administrative Director of the Ebla Chora Project, for recruiting me to work on this multidisciplinary research program. Piotr Steinkeller allowed me to use and quote from his 2004 unpublished paper “From Ebla to Babylonia: The Impact of the Ebla Discoveries on the Understanding of Early Mesopotamian History.” Claudia Wachter-Sarkady made available to me her preliminary report on the archaeobotanical finds from Ebla and offered several valuable comments and suggestions. Jacopo Pasquali provided helpful feedback. Glenn Magid revised my English text. My gratitude goes to all of them. This study would not have been possible without the financial support of the Sapienza University of Rome. As usual, the research environment of the Department of History and Cultures at the University of Bologna has proved to be tremendously effective and I am very grateful to all my colleagues there and especially to Nicolò Marchetti.
- 2 Steinkeller points out the existence of a unique document (ARET XIII 3) that mentions a delivery of ten logs of boxwood from a high-ranking Eblaite official to an officer of the Transjordanian city of Ḥamazi. In addition, “60 high-quality *tiyārum*-trees” (60 ^{ges}TI.ĀR SAG₉) plus “620 *tiyārum*-trees” of ordinary quality (6 *mi-at* 20 ^{ges}TI.ĀR) for the “house of carpenters” (É NAGAR) are recorded in TM.75.G.1432 (Archi 1986, 193 and plate I). Purchases of boxwood (^{ges}DASGARIN_x) and *tiyārum*-wood (^{ges}TI.ĀR) on the occasion of fairs are also mentioned occasionally (see Biga 2002, 285–87; note that in Biga’s quotations, the logograms for these two types of tree/wood are transliterated as “GIŠ-taskarin” and “GIŠ-ti-ḤAR,” respectively).
- 3 “Throughout the third millennium (and the same is true of later periods, of course) administrative texts

- practically never record deliveries of timber, stone, and metals. When we learn about these materials, which in itself is not that common, they are already being processed and turned into finished objects” (Steinkeller 2004).
- 4 “[Ebla] controlled one of the main overland routes along which timber was transported from the Mediterranean to the Euphrates. As I see it, the route in question most likely began somewhere near the present-day pass to Lataqia over Jebel el-Ansariyeh (Bdarma pass), ran via Ebla and Aleppo, and ended at the Euphrates near or at Emar. In addition, it is highly likely that Ebla also controlled the timber route leading from the Amanus. The latter route, which probably terminated at Karkemish, may have been even more important” (ibidem).
 - 5 Steinkeller suggests that the *ba-rúm* of TM.82.G.266 (Archi 1993b, 8–11, plates II–III, X–XI), whose value is given as 1,500 minas of gold (rev. iv 2–4), could be a sort of duty tax or customs. Moreover, he draws attention to the 1,700 minas of silver that are recorded in the same text as the value of (Steinkeller: “income from”) an undetermined quantity of valuable timber (rev. v 4–7).
 - 6 Note that the metric equivalents of the quantities of cereals and oil recorded in the texts are probably much larger than the figures given by Archi: in converting the Eblaite *kubārum* (Archi’s “*gubar*”) and LA.ĤA in our capacity system, Archi assumes that these measuring vessels had standard capacities of 16.8 l and 25.2 l, respectively, but they were more likely more capacious (see below, notes 30 and 32).
 - 7 This is mainly due to the fact that Eblaite scribes often did not use the Sumero-Akkadian logograms peculiar to southern Babylonian writing with which modern scholars are well acquainted. Their writing system derives from a different scribal tradition, one that presumably originated in northern Babylonia (the so-called Kiš Civilization) and of which there are almost no remaining traces before the Eblaite texts.
 - 8 By *archival texts* we mean not only the administrative tablets, but also the official correspondence that was kept in the Royal Archives of Ebla and the so-called ritual texts that are published in ARET XI—the latter being not ritual texts proper but rather descriptive accounts of performed rites.
 - 9 For the general problem of identifying the referents of the ancient plant names that occur in cuneiform sources, see Postgate (1984, 6–7) and Powell (2003–2005, 13–15).
 - 10 Discussions of select names of plants or trees in the Eblaite vocabularies are also found in Krebern timer (1983), Fronzaroli (1984a; 1984b), Butz (1987), Conti (1990), Sjöberg (1999; 2003a; 2003b; 2004), and Civil (2008).
 - 11 By *Akkadogram* we mean, more precisely, a logogram consisting of a fossilized writing of a Semitic word. In other words, Akkadograms originated in syllabic spellings of Akkadian or Eblaite words (Eblaite being a dialect of Akkadian), which in the course of time became frozen spellings that were employed as if they were logograms (for instance, *MA.LIK*—originally a syllabic writing of *malik*, the absolute form of *malkum*—was used as a logographic spelling for *malkum*, “king”).
 - 12 Also quoted in full by Pettinato (1986, 408–9; 1991, 253–54).
 - 13 The text on the reverse does not follow the physical order of columns: it goes from col. i to iii, and then, in reverse order, from col. viii to iv. It should also be noted that in Archi’s (1986b, 197) transliteration of viii 3–vii 1, “*zíd-gu*” is a misprint (cf. p. 205 s.v. “*zíd-gig*”); the published photos of the tablet (ibidem, plate IV; Pettinato 1986, plate XXIV), in fact, show GĪB in viii 3 (the photos do not allow us to establish whether ZĪD is also present, before GĪB; note that Pettinato [1986, 411; 1991, 256] transliterates “*gig*”) and ZĪD GĪB in vii 1. At any rate, regardless of what can presently be read on the tablet, ZĪD GĪB is expected to have originally occurred in both of these passages.
 - 14 Note that Archi transliterates GĪB as “*gig*” (see following note).
 - 15 Note the spelling ^{gi-i}b, quoted by Yang (1989, 164n28), with the pronunciation gloss ^{gi-i}b that indicates the correct reading /gib/ of the sign GIG when it denotes “wheat” (see also Powell 1984, 56–57).
 - 16 Diakonoff (1981, 36) already noticed that **kib-t-*, “to judge by the form of the stem, might have been an ancient Afrasian [word] (root pattern C₁VC₂).”
 - 17 The hypothesis of a borrowing of *kibtu(m)* from Sumerian is also questioned by Powell (1984, 57), who observes that the Akkadian term “cannot be a loan directly from /gib/, since this does not fit any common pattern of borrowing.”
 - 18 The Eblaite reading of GĪB is unknown, but it is conceivable that GĪB stood for a word related to Akkadian *kibtu(m)*, since the Common West Semitic word for “wheat,” **hint-(at-)* (see Diakonoff 1981, 35;

- Pentiuc 2001, 70; Kogan 2012, 246), which occurs at Ebla in the form *hiṭṭū*, means “grain, cereals” in Eblaite (see s.v. **i-du*). Or, as an alternative, we may think of a cognate of Mari Akkadian *burrum* (a cereal, probably “wheat”) and Arabic *burr*-, “wheat” (see Bottéro 1957, 252; Fronzaroli 1969, 296; Kogan 2012, 246–47). In this connection, note the term *burtum*, possibly from the same root, which denoted a type of bread (MEE 4, 81 i 3-4: ÌNDA.GÉME = *bù-ur-tum*; see Conti 1990, 75n53; Sjöberg 2004, 257–58; not attested in the administrative texts from Ebla).
- 19 Carbonized seeds of bread wheat cannot be distinguished from those of hard wheat (Wachter-Sarkady, pers. comm.).
 - 20 For this alleged extinct wheat, see Kislev (1979–1980). Doubts concerning Kislev’s identification of the *Triticum parvicoccum* species were expressed by Hillman (2001, 30–31) and Nesbitt (2001, 43).
 - 21 Hard wheat, also known as durum wheat or macaroni wheat, is well suited to the Mediterranean climate that we may expect obtained at Ebla in the second half of the third millennium B.C. (Wachter-Sarkady, pers. comm.). In this connection, it should be noted that *Triticum durum* was reportedly identified at Tell Brak, in the Khabur Valley, in samples from the EBA (Charles and Bogaard 2001, 309 and table 33). This important discovery raises the possibility that the charred grains identified as *Triticum aestivum/durum* in northern Syrian sites with a presumably Mediterranean type climate, such as Ebla or Hammam et-Turkman, were, in fact, hard wheat (see van Zeist, Waterbolk-van Rooijen, and Bottema 1988, 707). On the other hand, the logogram GIB could have been used to denote every kind of free-threshing cereal, including rye (*secale cereale*), which is also attested in the archaeobotanical record of Ebla (see Wachter-Sarkady, in this volume).
 - 22 It should be noted that free-threshing cereals have less chance of being recovered than barley or the glume wheats (i.e., emmer and einkorn), because of the fact that they did not need to be parched during the threshing process. As Charles (1984, 27) points out, “the necessity of parching the spikelets of the glume species markedly increases their chances of survival in the archaeological record, and may mean that the free-threshing wheats are misleadingly underrepresented by comparison” (see also Hillman 1978, 169–70). Moreover, the widespread use of dung cakes as fuel very much enhances the possibility of finding charred seeds of cereals that were used as fodder, whereas cereals that are only used for human consumption hardly leave traces (Miller 1984).
 - 23 For *LAK* 524 (i.e., ZUM×TÚG) = *gariḡ*, corresponding to later ^{ga}*gáriḡ* (ZUM) = Akkadian *muštu(m)*, “comb,” see Civil (1967, 210–11; 2008, 63, 94). For *gáriḡ*, see Mittermayer and Attinger 2006 (182 sub 456, 204–5, comment to 456). Note that a value “zúm” for the sign *LAK* 524 is not attested (Borger 2003, 225 sub 885).
 - 24 See previous note. Cf. VE 1359’: “*giš-zum*” (read ^{ga}GARIḡ?) = *mu-sa-tum*, in which the Eblaite gloss is almost certainly to be interpreted as *mušātum*, “comb” (in Eblaite).
 - 25 This process is called “rippling.” After harvesting, dry flax is pulled through the “teeth” of a wooden or metal comb, the ripple, which makes the seeds fall off (see Breniquet 2008, 105). For Neolithic and EBA combs (made of wood or bones) that might have been used to ripple flax, see Adovasio and Andrews (1982, 62–68) and Breniquet (2006) (but note the criticism by Breniquet 2008, 105–6, against an interpretation of these combs as ripples).
 - 26 Combing must be performed in order to separate the long fibers suitable for spinning from those that are too short for that use (Breniquet 2008, 107).
 - 27 Although flax was primarily cultivated for fiber in ancient times (Waetzoldt 1980–1983; 1985a, 77–78; Powell 1991, 160; Breniquet 2008, 88–89; Kislev et al. 2011), its use for extracting oil is considered by archaeobotanists to be equally old, if not probably older (see, most recently, Zohary, Hopf, and Weiss 2012, 103–6). In this connection, it should be noted that recent genetic studies suggest that flax varieties more suitable for producing oil than fiber were domesticated first (ibidem, 106; see also Fu, Diederichsen, and Allaby 2012). Linseed oil might also have been employed for uses other than alimentary ones (see Renfrew 1985, 63–64; Ertuğ 2000, 173n5).
 - 28 When flax is grown for fiber, seeds are usually sown more densely than in the case of flax cultivated for seeds. Linseeds are occasionally mentioned in Sumerian and Akkadian sources (see *CAD* K 473), but we lack comparative data concerning seed rates for flax in ancient Mesopotamia. In modern agriculture, the sowing rates for barley, fiber flax, and oil flax are respectively 130–160 kg/ha, 120–150 kg/ha, and 75 kg/ha, while the weight per liter for barley and flax (both fiber flax and oil flax) is respectively 600–650 g and 650–700 g (data courtesy of Marco Vignudelli). It should be noted, however, that modern species of

- barley are the product of many selections and genetic improvements, which means that they probably have a higher germination capacity as compared to ancient species (Vignudelli, pers. comm.). This fact and modern treatments of seeds and land could account for the different ratio between the sowing rates for barley and flax in antiquity (ca. 4 to 1) versus modern times (ca. 2 to 1, in the case of oil flax, and ca. 1 to 1, in that of fiber flax). Finally, consider that the distinction between oil flax and fiber flax may not apply to ancient plants; according to Fu, Diederichsen, and Allaby (2012), fiber varieties of flax derived, in fact, from a lineage of flax domesticated for oil in relatively recent times (ca. 3000 years before present).
- 29 See photo-detail of the right edge on pl. XLVII: [...G]Ú.BAR [GÌ]B.GÜNU.
- 30 GÚ.BAR is probably an Akkadogram for *kubārum*, “the large one” (of the measuring vessels) (see Pettinato 1974–1977, 26; Fronzaroli 2003, 315). The *kubārum*, which was used as a measure of capacity for arids, is known to equal 120 *assammū* (AN.ZAM_u), “goblets” (see, most recently, Chambon 2011b, 50–51, 128–32), but the absolute value of the latter unit is a matter of serious controversy. Milano (1987a, 180; 1987b, 528–29; 1990b, 349) suggested that the “goblet” (*assammum*) should equal the Mesopotamian *sila*, which is either 0.85 or (about) one liter. This equivalence is disputed by Archi (2006b, 21n18), who thinks that the unit in question only measured 0.16 liter (Archi 2002, 187). However, such a value appears to be decidedly too little, especially considering that the standard amount of food rations for the personnel was two “goblets” per day (Milano 1996, 146). More recently, Chambon (2004; 2011b, 56–57) has proposed 0.5 or 0.6 liter for the Eblaite *assammum*, which implies a capacity of sixty or seventy-two liters for the *kubārum*.
- 31 ĜĖŠ.PA is certainly neither a logogram for “spike” (Pettinato 1986, 410–11; 1991, 255–56) nor some kind of foodstuff (Waetzoldt 2001, 361). The term in question is a qualifier of vessels (Archi 1986b, 201 s.v. “GİŠ-PA”) and here probably means “made of wood, wooden” (cf. VE 467c: ĜĖŠ.PA = *ġu-sa-b[ū]*, “wood;” see Kreberník 1983, 17; Conti 1990, 135–36). In this connection, note that GÚ.BAR and LA.ĤA in TM.75.G.1536 refer not to capacity measures, but rather to actual vessels filled with foodstuffs, as is suggested by the fact that standard “LA.ĤA-jars” (LA.ĤA), “big LA.ĤA-jars” (LA.ĤA MAĤ) and “small LA.ĤA-jars” (LA.ĤA TUR) are summed together in the totals.
- 32 The logogram LA.ĤA stems from the Sumerian word *la-ġa(-an)*, “bottle, flask” (Civil 2008, 136, comment to line 333), but at Ebla it designated a large-size storage jar for liquids, flour, and other foodstuffs (cf. Archi 1999b, 152–53). Its capacity was thirty Eblaite SĪLA (which, according to Archi [ibidem], are about thirty liters; according to Milano [1996, 146], however, “il n’y a encore aucune preuve décisive... que le *sila* ait, à Ebla, la même... valeur absolue que le *sila* mésopotamien [de un litre]”) and 180 *assammū* (Milano 1990b, 350–51; cf. above, note 30). For the actual sizes of this type of vessel, see also Pasquali (2005, 39–40), who, noticing the large quantities of precious metals that were issued by the central administration for the manufacture of LA.ĤA-jars, remarks that they had to be of enormous dimensions.
- 33 As Pettinato read GÌB.GÜNU.TUR^{gwr}.
- 34 “There are several types of lentils and their seed color varies considerably, ranging from yellowish, reddish, pale and dark green, and brown to black. Seeds can also have brown or black spots, speckling or mottling. Moreover, the seeds of lentils are composed of two halves and can thus be said to be ‘split’ ” (Wachter-Sarkady, pers. comm.).
- 35 Seeds of bitter vetch (*Vicia ervilla*) have been found at Ebla, although their number is pretty low in samples from the EBA (see Wachter-Sarkady, in this volume). This legume probably only occurred as a field weed.
- 36 Only nine seeds of broad bean (*Vicia faba*) have been found (see Wachter-Sarkady, in this volume). Cf. Powell 2003–2005, 14.
- 37 The explanation that Archi (1990a, 50–51) gives for the apparent lack of references to legumes in the Ebla administrative texts—namely, the fact that such texts are concerned only with large-scale production and thus only account for plants and fruit that were cultivated on vast areas—is not convincing. A great quantity of seeds of both lentils and field peas were found in samples from the EBA Royal Palace, together with barley and glume-wheat grains (see Wachter-Sarkady, in this volume). In fact, it is very likely that legumes were rotated with cereals at Ebla, and that they had a very significant role in Ebla’s agricultural economy (Wachter-Sarkady, pers. comm.).
- 38 That is, GÚ.GAL(.GAL) and GÚ.TUR(.TUR) (see Stol 1985; García Lenberg 1999; Powell 2003–2005, 21–22).
- 39 In such compounds as GÌB.GARIĜ.TUR, GÌB.GÜNU(.TUR^{gwr}), and GÌB.TUR, the logogram

- for “(free-threshing) wheat,” GÌB, appears to have the broader significance of “naked seed.” Thus, not only was wheat proper considered to be a type of GÌB, but so were peas, lentils, and even linseeds (see s.v. GÌB.GARIĜ.TUR). The sign TUR in these logograms presumably refers to the dimensions of the seeds of these plants, which were smaller than grains of bread/hard wheat. In this connection, note the following average sizes of the seeds in question in the EBA archaeobotanical record of Ebla: *Triticum aestivum/durum*: 4.85 (length) × 2.76 (breadth) mm; *Lens culinaris*: diameter: 3.23 mm; *Pisum sativum*: diameter: 2.57 mm; *Linum usitatissimum*: 2.9 × 1.5 mm (data courtesy of Wachter-Sarkady).
- 40 All these spellings probably represent the plural *gurgurū/kurkurū*.
- 41 Such as *’allānum*, “acorn” (Pasquali 2005, 98–101); *ḫazannum*, “bulb (of an alliaceous plant)” (ibidem, 153–55); *’iškālum*, “bunch of grapes” (ibidem, 156); *’šallūrum*, “plum” (?) (Civil 2008, 63); *tarintum* or *tarittum*, “pine cone” (Pasquali 2005, 120–21; Civil 2008, 59).
- 42 See also the entry $gú-kur_4^{ku-ku-ru}kur_4 = ku[r^2-ku(r)^2-ru^2]$ in the twenty-fourth tablet of the lexical series *ḪAR-ra = ḫubullu*, between *gú-gal-gal{-la}*, “big pulses,” and *gú-tur*, “small pulse, lentil” (MSL 11, 81, lines 125–127).
- 43 For *parisātum*, one would rather expect the writing *bari-za-tum* (see Conti 1990, 9–12). Note that the scribe of TM.75.G.1536 wrote consistently *saltum*, “emmer groats (?)”, as *za-la-tum* (see col. i 5, iii 3, 4, viii 1).
- 44 Note that the explanatory term *kūšu* means “skin, shell.” Eblaite *barrišātum* (feminine plural) and Akkadian *barrišu* are probably related etymologically to the Akkadian verb *barāšu(m)*, “to pluck out” (pods are harvested by plucking).
- 45 There are several possible advantages to keep pods rather than storing naked seeds. First, seeds are more protected against attacks by insects and other parasites; second, pods retain a little humidity that makes the seeds not dry too fast, which would damage their skin; third, pods can be open more easily when they are dry (Wachter-Sarkady, pers. comm.).
- 46 Small-grained wheat appears not to be attested in the archaeobotanical record of coeval northern Syrian sites (see Bottema and Cappers 2000, table 1; Riehl 2001, 158–63). For some rare finds in Mesopotamia, see Renfrew (1984, 35).
- 47 For the value of the *kubārum*, see above, note 30.
- 48 So also do D’Agostino (1996, 81–82), who renders GÚ.GÌB as “frumento,” and Waetzoldt, who writes: “An Getreidesorten kennen wir Gerste, Emmer und Weizen..., wobei gig nochmals unterteilt wird in gig-tur und gú-gig” (in Kienast and Waetzoldt 1990, 36).
- 49 The spelling GÚ.GÌB for GÚ.NUNUZ does occur in a Pre-Sargonic text from Lagaš (*DP* 549 i 2), but it should probably be regarded as a scribal mistake or an error of copying (note that GÌB is graphically formed by the junction of the signs MI and NUNUZ).
- 50 Accordingly, lexical texts from the Early Dynastic period consistently list (zíz-)GÚ.NUNUZ in sections dealing with emmer varieties and emmer products; see *SF* 20 rev. v 5 // 21 rev. vii 2; CUSAS 12, 6.3.1 xii 6 (Civil 2010, 207, 212).
- 51 Note that Archi reads KAL as “sig₁₅.”
- 52 This reading was introduced in Assyriological literature by Oppenheim (1948, 137, 255), who misquoted MMA 86.11.368 v 20 (Spar and Lambert 2005, plate 75), [ninda]-^{si-ga}KAL, as “zi^{si}-ikKAL” (see Civil in Spar and Lambert 2005, 237).
- 53 On the strength of the *lectio melior* provided by the Old Babylonian syllabary Proto-Ea (MSL 14, 45, line 341). The value sig₁₅ represents a secondary form that is only found in lexical sources of the first millennium B.C. (see following note).
- 54 See Ea IV 314–316 (MSL 14, 367–68): [s]i-ig KAL = *dam-qu* (“fine, of high quality”), [si]-ga KAL = 2 (i.e., idem as above), [si-ga] KAL = *ḫi-iš-le-e-tú* (a type of high-quality flour); Diri V 156 (MSL 15, 172): zi-si-[ig/ga ZÍD.KAL = *ḫišlētu*]; MMA 86.11.368 v 20 (Spar and Lambert 2005, plate 75): [ninda]-^{si-ga}sig₁₅(KAL) = MIN (i.e., *akal*) *ḫi-iš-le-e-tu*₄ (“*ḫišlētu*-bread,” i.e., bread made of *ḫišlētu*-flour). Cf. *SpTU* 115 iv x+21 (von Weiher 1988, 233, 332): zì-^{ka-al}KAL = *qé-me ḫi-iš-le-e-tú*. That sag₈/sig₁₅/sig₁₅ means “of first class” or the like is also suggested by a passage in an Early Sargonic text from Adab (CUSAS 11, 312: 1–3 [Visicato and Westenholz 2010, 86]) that reads: 9.0.0 še sag₈ gur / 6.2.0 še gur ús / 4.2.0 še ús-3: “2,160 l of first-quality barley / 1,560 l of second-quality barley / 1,080 l of third-quality barley.”
- 55 Both texts mention KAL seeds together with barley seeds and emmer seeds, which were used (or to be used) to sow defined areas of land. Various amounts of KAL for sowing are also recorded in TM.75.G.2577 (quoted by Archi 1999a, 514), TM.76.G.140, and

- TM.76.G.262 (both unpublished; see Milano 1996, 148).
- 56 Archi (1999a, 504) attributed to Selz the opinion that the sign KAL should be interpreted as the writing of a cereal name in the Pre-Sargonic texts of Lagaš as well. However, Selz (1989, 247) actually says that “KAL mag... ein Spezifikum [i.e., specific characteristic] des Emmers (und des Weizens?) kennzeichnen und ist vielleicht mit der Biersorte kas-KAL in Verbindung zu bringen, die sich durch einen bedeutenden Emmeranteil auszeichnete.... Ob entsprechend auch zíd-KAL eine Emmer- oder Weizenmehlsorte gewesen ist, läßt sich unseren Belegen nicht entnehmen.”
 - 57 So already Milano (1990b, 330: “farina di frumento”) and Archi (2005a, 14: “flour of einkorn”).
 - 58 In Mesopotamia this kind of flour was made of either emmer (Brunke 2008, 23n37, 29, 31) or a mixture of emmer and wheat (Cooper 1985, 113). Note that the Eblaite term for “first quality” was written with the logogram SAĜ (= **raštiyūm*?); see, for instance, ARET IX 9 i 2: 1 *GÚ.BAR ŠE.ZÍD.GU SAĜ* 1 ½ *GÚ.BAR ŠE.ZÍD.GU KA.AK*, “1 *kubārum*-measure of fine barley flour of first quality (and) 1 ½ *kubārum*-measure of (ordinary) fine barley flour (for) repasts.”
 - 59 Tell Brak, ancient Nagar, was the capital of the homonymous kingdom, to which Beydar also belonged. Although the paleobotanical data from Beydar have not been published yet (see provisionally Van Lerberghe in Ismail et al. 1996, 120), we can reasonably consider those of Brak as representative of the entire region.
 - 60 For Beydar, see Widell (2003, 725–26).
 - 61 For Ebla, see Wachter-Sarkady, in this volume. For Brak, see Charles and Bogaard (2001, 308–9 and table 33).
 - 62 Wachter-Sarkady informed me of yet another reason why einkorn might have been considered “strong” or “very valuable”: its flour has a very high content of proteins and glue. In past centuries in Europe, the hulled grains of *Triticum monococcum* were used as a concentrated, high-energy fodder for horses.
 - 63 See ARET II 17 iv 3: 10 KAL *GÚ.BAR* 10 *ZÍZ GÚ.BAR BAPPIR*, “10 *kubārum*-measures of KAL-cereal (and) 10 *kubārum*-measures of emmer: (for making) BAPPIR.” The exact meaning of the Sumerian term *babir*/*bappir* (a cereal product that was used in the beer-making process) remains elusive (see Oppenheim 1950, 11; Civil 1964, 76–78; Stol 1971, 168–69; 1987–1990, 325–26; Powell 1994, 94, 97–99; Damerow 2012; Sallaberger 2012, 308–16). For BAPPIR in the Ebla texts, see Milano (1990b, 379 and 400, s.vv. “bappir” and “ninda-bappir”) and Fronzaroli (1994, 124–25).
 - 64 The references are to J. Percival, *The Wheat Plant* (London 1921) and to R.Y. Rozhevits and B.K. Shishkin, “Gramineae,” in Komarov et al., *Flora Unionis Rerumpublicarum Sovieticarum Socialisticarum*, vol. 2 (Leningrad 1934; English translation, Jerusalem 1963).
 - 65 For the meaning of *saltum* (*za-la-tum*), possibly “emmer groats,” see Milano (1987b, 528 with note 28; 1993–1997, 27–28).
 - 66 Modern sowing rates for einkorn and emmer (sown as winter crops) range from 70 to 150 and from 130 to 180 kilograms per hectare, respectively (Lembacher and Schally 2009; reference courtesy Wachter-Sarkady). Converting them into liters per hectare, we obtain a sowing rate of 212–455 l/ha for einkorn, and 394–545 l/ha for emmer (according to my own measurements, one liter of einkorn and one liter of emmer have exactly the same weight, that is 330 g).
 - 67 Huge quantities of barley are recorded in TM.75.G.1700 (Archi 1982, 182 and figs. 9–11) and TM.82.G.266 (Archi 1993b, 8–11, plates II–III, X–XI, 13–14).
 - 68 For the reading *gíg*i (not *gi*₆) of the sign MI when it occurs as an adjective in the sense of “black/dark,” see Krispijn (1981–1982, 50, comment to col. i 4). Note that *gi*₆ or, more precisely, *ĝi*₆ is instead the Sumerian word for “night/darkness.”
 - 69 Roasted barley flour was called *šahīrum*, “dark flour,” in Eblaite. See VE 679: ŠE.ZÍD.SA = *sa-i-lum*, *sa-i-lu-um* (Conti 1990, 179; Milano 1990b, 406).
 - 70 See (1) VE 672: ŠE.BIL = *ga-a-tum* (almost certainly to be connected with Akkadian *qayyātu(m)* [“a parched grain and a food made from it,” according to CAD Q 54 s.v. “*qajātu*”]; cf. *ninda-ninda še sa-a* = NINDA.MEŠ *qa-ia-ti*, “loaves of roasted barley,” in HAR-ra Emar XXIII 68' [Arnaud 1987, 157], and *zì še* [s]a-a = *qé-me qa-a-a-ti*, “roasted barley flour,” in SpTU 115 iv x+31 [von Weiher 1988, 233, 332]) and (2) VE 678: ŠE.SA = *sa-a-tum* (“roasted barley,” see Conti 1990, 678). See also s.v. ŠE NE-*ti-gi*-LUM.
 - 71 Archi (1999a, 509) translates TM.75.G.156 iii 2 as “10 *gubar* of N.-barley (as seed).”
 - 72 Cf. Arabic *dakina*, “to be blakish.” For ŠE.BIL, see above, note 70.

- 73 As Kraus (1977, 8 and 10 [note f to text 10]) pointed out, the Akkadian term for “emmer” is at least in Old Babylonian a plurale tantum and should therefore be reconstructed as *kunāšū*, rather than *kunāšu(m)* (as one finds in the two principal dictionaries of Akkadian, *AHW* and *CAD*; see ARM 6, 15:20-21: 5.0.0 GUR *ku-na-ši ad-di-in-šum*; CT 52, 10 rev. 5'-6' (Kraus 1977, 8–11): 0.0.2 3 ŠĪLA *ku-na-ši... ia-ti ub-la-ki*; and so forth. The same is probably also true of the two related forms that occur in the Peripheral Akkadian of the Late Bronze Age and in first-millennium texts; accordingly, these should be transcribed as *kunīšū* and *kunšū* (rather than *kunīšu* and *kunšu*), although the final *ū* of the plural may no longer have been pronounced as a long vowel.
- 74 The two words must stem from a common Proto-Semitic ancestor, probably to be reconstructed as **kunāt-* (see Fronzaroli 1969, 297).
- 75 RS 20.123+ ii 45' (Nougayrol et al. 1968, 421): [zíz = *ku-un*]-šū (Akkadian) = *ut-te* (Hurrian) = *ku-sū-m[u-ma]* (Ugaritic) (restored after RS 94-2939 v 15' [André-Salvini and Salvini 1998, 7]: zíz = *ku-un-šu* = *ut-te*; see van Soldt 1981). See also below, note 77.
- 76 The common ancestor of these two words should be **kussam-* (Kogan 2010, 30) or **kusām-*. For the identification of the referent of Hebrew *kusset* as emmer instead of spelt, see Hrozný (1913, 23–25) and Hillman (1984, 146n1).
- 77 According to the attestations collected by del Olmo Lete and Sanmartín (2004, 462–63 s.v. “*ks/šm(n)*”), the word for “emmer” in Ugaritic alphabetic texts always occurs in the plural, variously written as *ks/šmm* or *kšmn* (the latter spelling representing the dialectal variant *kussumūna*; see Gordon 1965, 422 sub 1283; and Huehnergard 1987, 297), with the exception of the expression *dt w ks/šm(!)*, of which two attestations are known (note that *KTU* 1.41:19 has *kšm* instead of *kšm*, while in the duplicate *KTU* 1.87 the expression in question is not preserved). It is quite obvious, however, that *ks/šm* in *dt w ks/šm* is not the singular of *ks/šmm*, “emmer,” but rather another word, possibly to be interpreted with Levine and de Terragon as “cups” (1993, 92, 96; see also Wyatt 2002, 351 with note 30); on the other hand, Huehnergard (pers. comm.) points out that “*ks* ‘cup’ is not written with *š* anywhere else, so *kšm* is unlikely to be a form of *ks*.”
- 78 This remarkable text, which was previously known only from a partial transliteration by Archi (1999a, 508), is published here by courtesy of Paolo Matthiae, Director of the Archaeological Expedition of the Sapienza University of Rome to Ebla.
- 79 The meaning “plot (of land),” or the like, for GĀNA(.KĒŠ)^{ki} is suggested by VE 842-844: GĀNA^{ki}, GĀNA.KĒŠ, KĒŠ^{ki} (three different abbreviations of GĀNA.KĒŠ^{ki}) = *zi-ti-a-lu* (< **zitti 'all(im) + -um*), “portion (of land) of a (single) hoe.” The term denoted a unit of surface whose value has been reckoned as corresponding to either 1/10 or 1/6 of the Mesopotamian *iku* of about 3,600 m² (see Pomponio 1983, 8–9, and Milano 1987a, respectively; cf., however, van Driel 2000, 275).
- 80 Another alleged tablet of this kind—TM.76.G.188 (Milano 1990a, 79; edited and discussed by Milano 1987a, 181–84)—is left out of consideration here, because the interpretation of it as a seed-and-surface text is very uncertain, if not unlikely (cf. van Driel 2000, 275).
- 81 One “helmet” (NÍĜ.SAĜ:ŠÚ) was either five or six “goblets,” depending on the manner in which the NÍĜ.SAĜ:ŠÚ-container was filled (full to the brim or heaped above; see Chambon 2011b, 50–51, 128–132), but in texts of this type it is to be reckoned as equaling five “goblets” (ibidem, 129 with note 513, and 131–32).
- 82 One *kubārum*-measure always equals 120 “goblets” (Eblaite: *assammū*), and not also 144 as Milano (1990b, 349–50) has hypothesized (see Chambon 2011b, 50–51, 128–32).



Figure 14.1. TM.75.G.10142, obv. – front view.



Figure 14.2. TM.75.G.10142, rev. – front view.



Figure 14.3. TM.75.G.10142, obv. – oblique view from top left.



Figure 14.4. TM.75.G.10142, obv. – oblique view from top right.



Figure 14.5. TM.75.G.10142, obv. – oblique view from bottom left.



Figure 14.6. TM.75.G.10142, obv. – oblique view from bottom right.



Figure 14.7. TM.75.G.10142, rev. – oblique view from top left.



Figure 14.8. TM.75.G.10142, rev. – oblique view from bottom right.

PART 4

Geomorphology and Remote Sensing

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CHAPTER 15

A LAND IN ITS SETTING

Remote Sensing Satellite Imagery for the Characterization of the Eblaite *Chora*

G. Bitelli, E. Mandanici, and L. Vittuari

1. INTRODUCTION¹

The use of remote sensing has become increasingly important in archaeology. In the framework of the Ebla Chora Project, a large number of research activities have been developed using multispectral satellite images at different geometric, radiometric, and spectral resolutions. Even though new ground surveys would be needed for the correct georeferencing of images and the validation of the results obtained so far, the examples reported here, based on a preliminary analysis of the images, highlight the possible contribution of these techniques, characterized by a multidisciplinary and multiscale approach, to researches on the Eblaite *chora*.

2. REMOTE SENSING AND ARCHAEOLOGY

Archaeologists started using remote sensing quite early compared to scholars of other disciplines. Aerial photography was firstly adopted at the beginning of the twentieth century to discover features not easily recognizable from the ground, and afterwards satellite imagery has become increasingly used (Sever 1995).

The increasing adoption of remote sensing in archaeology has several reasons and it is reflected in different types of applications (Wiseman and El-Baz 2008; Lasaponara and Masini 2012).

Today the availability of satellite imagery with very high spectral and spatial resolution allows new approaches both to archaeological research in the strict sense and to multidisciplinary studies of wide regions used to contextualize the data emerging from the field.

Possible uses of satellite imagery include:

1. Visual and machine-based image interpretation in areas of archaeological interest;
2. Feature detection and extraction, pattern recognition;
3. Thematic classification of landcover or other aspects;
4. Landscape analysis;
5. Morphological description (e.g., through DTM generation) and classification;
6. Monitoring of areas.

Remote sensing is becoming an important task in many archaeological missions, also because it allows to study remote areas not always accessible, and because it is an excellent common ground to connect researchers from different disciplines. This kind of survey must be conducted with great attention to technical aspects, and many processing procedures must be used with care to obtain the desired results. Moreover, the use of remote sensing in archaeology is interwoven with the most modern techniques of geomatics (Bitelli 2012).

A large number of research activities within the Ebla Chora Project have been developed using multispectral satellite images at different geometric, radiometric, and spectral resolutions. This paper discusses some of the results obtained so far. Unfortunately, the current difficulty of conducting surveys on the field has hampered many of the projects related to the use of remote sensing: it would be essential to conduct topographic surveys on the ground for a proper geometric correction and georeferencing of images, and intensive ground validation activities for a confirmation of the results of the classification procedures. However, some activities that were carried out, which may constitute the basic data of a GIS for the study of the region, will be briefly summarized in the following, starting from the analysis carried out at the regional level.

3. REGIONAL SCALE ANALYSIS AND DTMS

At a regional level it is important to have a wide and properly georeferenced base. This geospatial base should encompass an orthophoto mosaic and a digital terrain model in order to provide a synoptic view of the context in which the site is set, regarding, for example, the main geomorphological features and land use patterns.

A mosaic made of four Landsat 5 TM images dated back to June 2009 covers a large area along the Syria–Turkey border. Since multispectral sensors like Landsat suffer from some radiometric instabilities, abrupt changes in the “color” of the adjacent images are apparent (Figure 15.1); thus, not only is an accurate rectification required, but also a radiometric homogenization of all the scenes is necessary. In this case, a good color balancing has been achieved in true color by applying an empirical line regression algorithm, normally adopted for atmospheric correction; the coefficients have been estimated from the overlapping strip between adjacent images. The final mosaic is presented in Plate 19.

The analysis at this scale requires also appropriate digital terrain models in order to obtain an accurate description of the elevations in the

area. Among the available solutions provided by remote sensing techniques, Figure 15.2 and Plate 20:1 show two medium-resolution models, both derived from satellite data. The first is the SRTM obtained by the Shuttle Radar Topography Mission (SRTM), which flew in February 2000 and provided publicly available elevation surface data for approximately 8 percent of the world’s land surface area, with a post spacing of 3 arc seconds (approximately corresponding to a resolution of 90 m). Plate 20:1 shows a detail of GDEM, a digital elevation model derived by ASTER satellite imagery, which provides stereoscopic capability in the near infrared band by nadir and backward viewing. Data are provided in GeoTiff format in 1°-by-1° tiles, with a posting interval of 1 arc second (approximately corresponding to a resolution of 90 m). This model, whilst at higher resolution, exhibits some artifacts; the analyses confirmed they are correlated to low values in the associated quality assessment (QA) file, reporting the number of scene-based DEMs contributing to the computing of the final GDEM elevation for each pixel. For this reason, a specific ASTER image of the study area (Abrams et al. 2002) acquired in 2001 was collected, and a 15 m DTM was calculated in-house (Hirano, Welch, and Lang 2003; Bitelli, Carrara, and Gusella 2005) using an area-based image-matching algorithm (Figure 15.3 shows a phase of this process).

Starting from this elevation model, several morphological maps can be obtained, such as the aspect map, which describes the direction (azimuth) that a surface faces (usually in degrees clockwise from north), and the slope map, defined as the percentage or degree change in elevation over distance. These parameters can be combined to produce the visibility map, a third level map which highlights the locations that are visible from specified viewpoints. For the present study, a visibility map has been for example produced in order to identify the locations that were visible from the old walls of Ebla. This analysis might contribute to our understanding of the interactions among the ancient sites in the area.

4. IMAGE CLASSIFICATION

Image classification is the process by which a thematic map is extracted from a digital image. The main difference with a traditional photointerpretation approach consists in the high level of automation. A typical product is the landcover map. For the present study, several landcover classifications were realized using multispectral medium-resolution imagery (ASTER and Landsat primarily): an example is shown in Plate 20:2. These analyses can provide thematic maps and statistic information about, for example, the extension of urban areas and cultivated lands and the distribution of different vegetation types. All supervised classification methods, however, require as initial input at least a small amount of “truth data” representing all the targeted classes, to be obtained by specific ground surveys. Image-processing algorithms extract the characteristics of the classes from these “training” data (Figure 15.4 shows, for example, the different spectral signatures for coniferous and deciduous trees in the area); then they automatically perform the classification task over the entire digital image. Unfortunately, the availability of truth data for the study area is very limited at the present time, thus the preliminary classification shown in Plate 20:2 considers few general classes such as urban area, cultivation, spontaneous vegetation, etc. Nevertheless it has been possible to test several classification methods. In particular, the sensitivity of different algorithms has been analyzed, but the results cannot be confirmed until truth checkpoints from the ground will be available.

The availability of archive images acquired in different years allows to perform a multitemporal analysis showing changes in land use, expansion of urban centers, and changes in vegetation and agricultural areas. For instance, in archeology the use of high-resolution declassified images coming from old reconnaissance satellites like the Corona project is becoming a powerful instrument for a visual or semiautomatic analysis of the territory and the changes occurred in the last decades. Examples for the area can be

retrieved in Beck et al. (2007) and in Bitelli and Girelli (2009); the latter refers to the Tilmen Höyük site in southeastern Turkey.

When a time series of multispectral images is available, it is possible to detect changes by classifying each image and comparing the results. Of course, statistical analyses are possible only if all the images are perfectly co-registered. In particular, for the present study, two Landsat 5 scenes acquired respectively in June 1987 and June 2007 have been compared. The obtained maps clearly show a wide expansion of the main urban areas and also of the cultivated lands, as a consequence of the government’s irrigation management plans.

5. HIGH RESOLUTION DATA AND PRODUCTS

Satellite remote sensing can provide useful data also at a local scale, that is at the scale of a single site, thanks to the availability of high-resolution images. In particular, for the present study two very high-resolution products were acquired on-demand by the Project.

The first product is an IRS-P5 Cartosat-1 stereo-couple (Table 15.1), which allows to produce a detailed digital terrain model by stereo-photogrammetric techniques. Given the spatial resolution of 2.5 m of the image couple, it is possible to produce a model at the resolution of few meters (Jacobsen 2005; Crespi et al. 2008). Of course, also in this case the absolute accuracy of the final product is strongly dependent on the availability of reliable ground control points (GCP) of known coordinates.

The second product is a WorldView-2 panchromatic and multispectral image composed by eight spectral bands at the resolution of 1.8 m, encompassing the visible and the near infrared portion of the electromagnetic spectrum, plus a panchromatic band at the resolution of 0.5 m. Figure 15.5 shows a portion of the WorldView-2 panchromatic image centered on the Ebla site.

After a suitable georeferencing procedure, again to be performed when GCPs are available for the area, a data fusion procedure can be applied

to provide a so-called “pan-sharpened” image, a derivate product which combines the high spatial resolution of the panchromatic band with the spectral information content of the multispectral ones.

The joint use of the Cartosat-derived digital terrain model and the WorldView-2 imagery can provide a very detailed description of the site area, especially regarding the micromorphology and the detection of features of potential archaeological interest. In particular, the identification on the images of already known archaeological sites allows a statistical analysis of their spectral and morphological behavior; this characterization may then permit an automatic recognition of other sites showing similar patterns, which may be a starting point for further investigations on the field. Once again, this kind of analysis cannot

be implemented before a sufficient amount of ground control data is available.

6. CONCLUSIONS

The adoption of multispectral satellite imagery can play a crucial role in the Ebla Chora Project, providing essential data and information for a multidisciplinary approach to the characterization of the Eblaite *chora*. The products derived can constitute not only a fundamental cartographic base for the establishment of GIS analyses, but also a contribution to the development of new kind of studies in this important archaeological area.

NOTES

- 1 We would like to thank Gabriele Proietti and Roberta De Nardo, who made an important contribution to the research presented here.

	PAN-FORE	PAN-AFT
Tilt Along Track	+26°	-5°
Spatial Resolution	2.5 m	2.5 m
Swath-width	30 km	27 km
Radiometric Resolution, Quantisation	10 bit	10 bit
Spectral Coverage	500–850 nm	500–850 nm
Focal Length	1.945 mm	1.945 mm
CCD Arrays (no. of arrays * no. of elements)	1 * 12.000	1 * 12.000
CCD Size	7 µm x 7 µm	7 µm x 7 µm
Integration Time	0.336 ms	0.336 ms

Table 15.1. Characteristics of IRS-P5 Cartosat-1 stereo-couple.

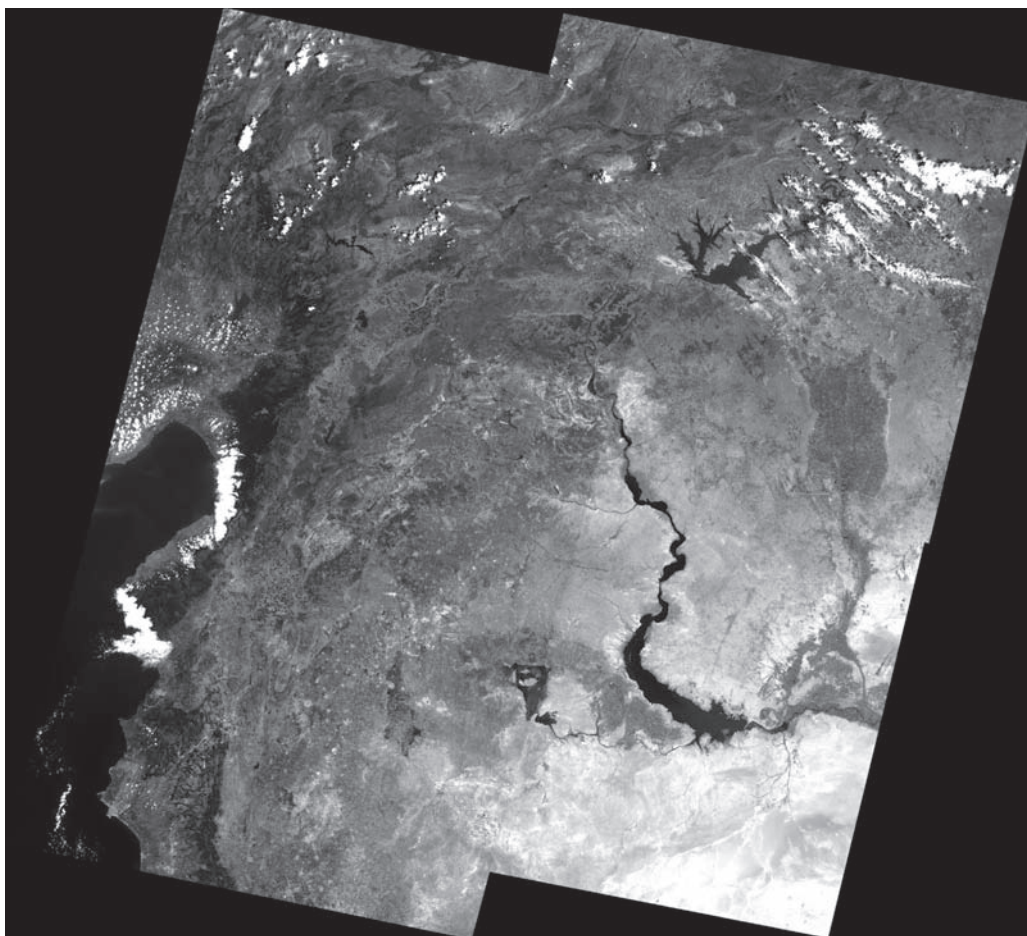


Figure 15.1. Mosaic of four Landsat images with unbalanced radiometry.

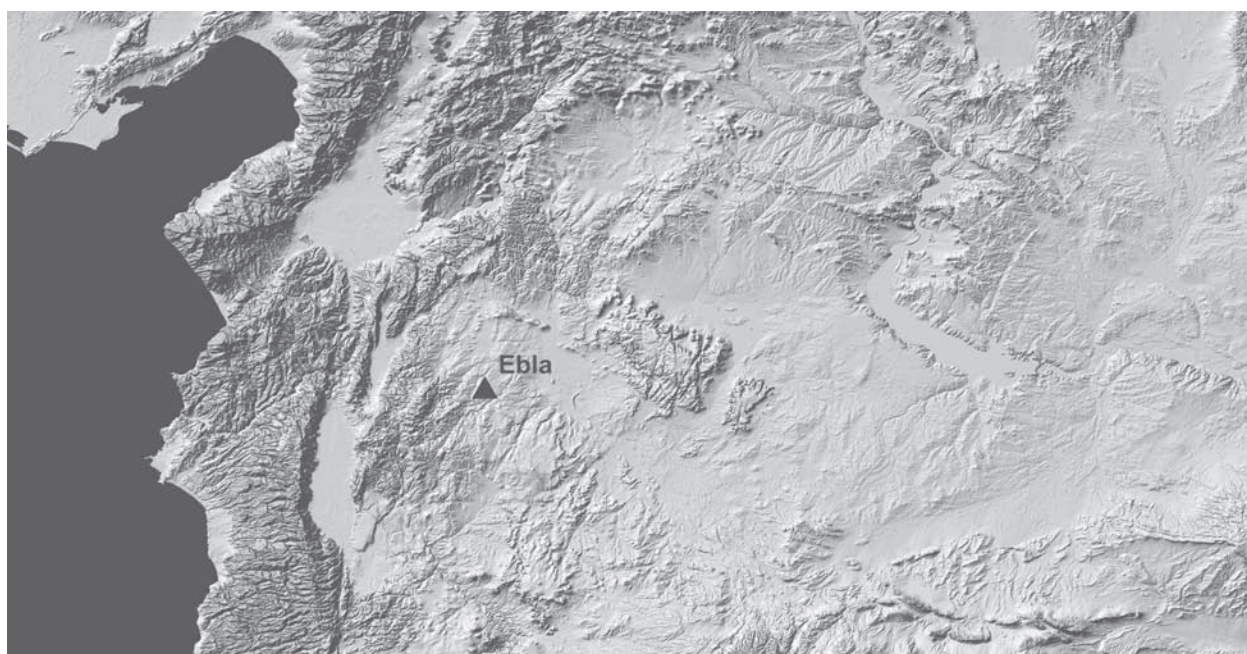


Figure 15.2. Hill shaded map of the region obtained by SRTM 4 elevation model.

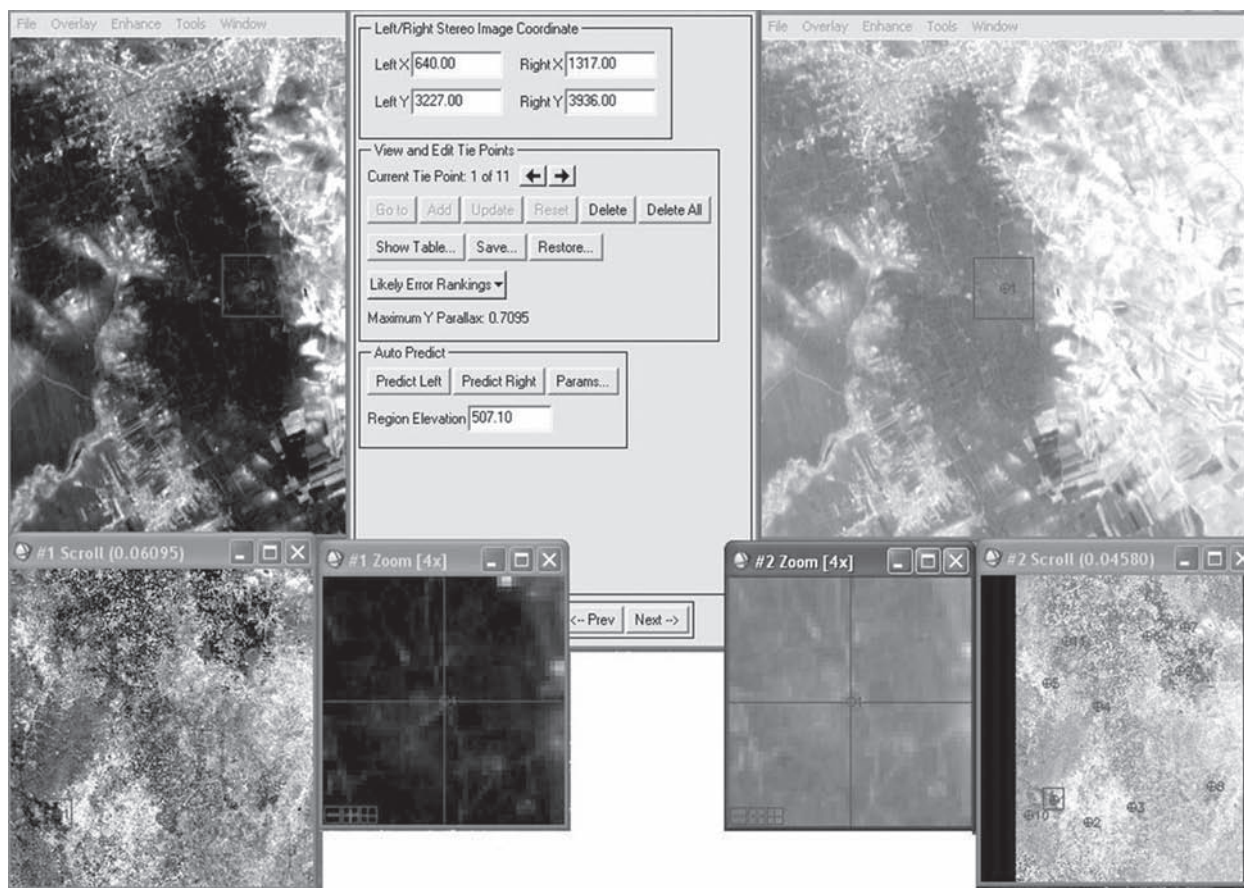


Figure 15.3. A phase of DEM generation by matching procedure using ASTER VNIR stereoisimaging.

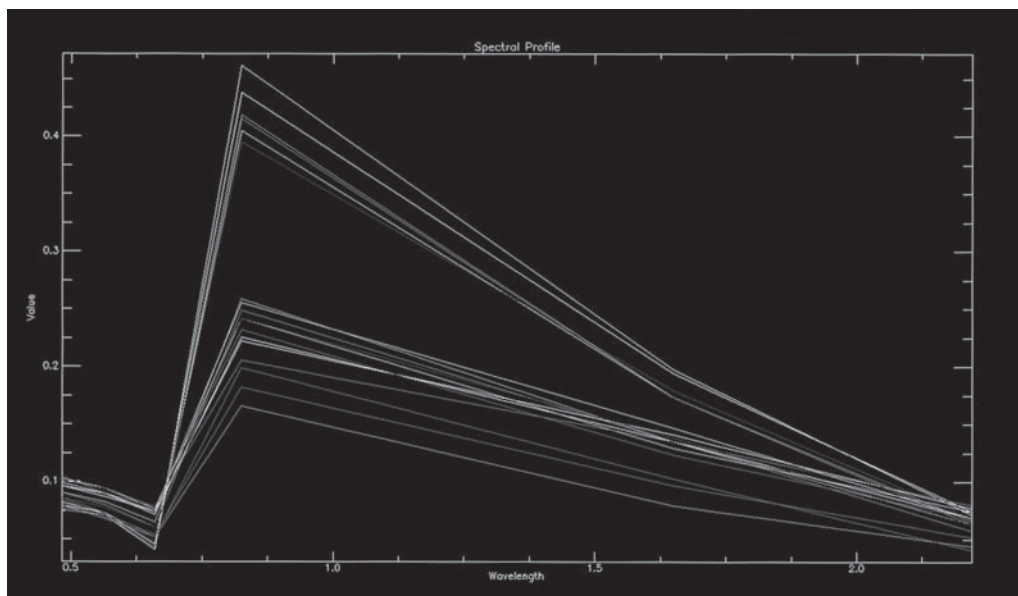


Figure 15.4. Different spectral signatures for coniferous and deciduous trees in the area.

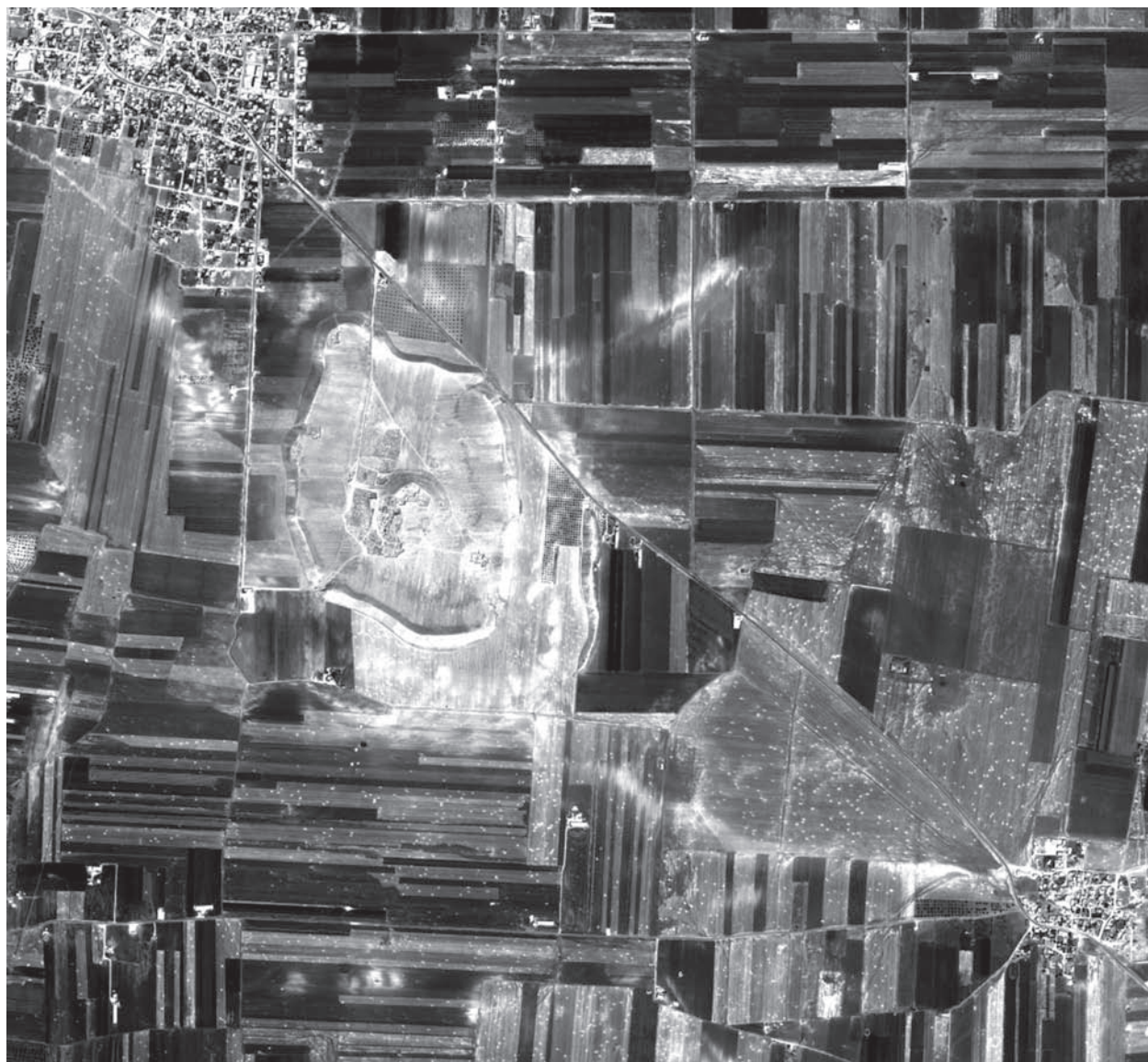


Figure 15.5. A portion of the WorldView-2 panchromatic image.

CHAPTER 16

ANALYSIS OF CORONA IMAGERY OF THE EBLA REGION

N. Galiatsatos and S. Mantellini

1. INTRODUCTION¹

The environment of Tell Mardikh/Ebla represents a key area to understand the urbanization process in the Ancient Near East, with specific reference to the third millennium B.C. However, after the early surveys carried out in this region between the 1960s and the 1970s, no systematic and up-to-date archaeological investigation has been attempted (see Mantellini, Micale, and Peyronel, in this volume). Thus, the first aim of the Ebla Chora Project (ECP) was to provide an assessment of the archaeological sites and landscape transformations in the area under investigation. One of the first and major tasks was therefore the location of landscape features due to past human activities, including tells, off-sites, canals, linear hollows, and other features of potential archaeological interest. The recent and numerous projects conducted on a regional scale between Syria and Mesopotamia highlighted the usefulness of combining the different spatial datasets available in order to reconstruct the settlement dynamics and the landscape transformations of a given territory (Galiatsatos et al. 2009). This paper will discuss the application of such an approach within the area investigated by the ECP in order to identify potential sites to be further explored on the ground.

2. SHORT OVERVIEW OF CORONA APPLICATIONS

The main dataset utilized by ECP in order to identify landscape features of potential

archaeological interest is the archive of Declassified Intelligence Satellite Photography (DISP), which contains photographs from the CORONA program.

CORONA was a program designed to support U.S. intelligence between 1958 and 1972. After the declassification of CORONA imagery in 1995, a huge database of imagery and documents was opened up to the world. Several works about CORONA have been published, some of them focusing on the history of the CORONA project (e.g., Ruffner 1995; Peebles 1997; McDonald 1997; Day, Longson, and Latell 1998; Cloud 2000), and others focused on its technical characteristics and applications (e.g., Dashora, Lohani, and Malik 2007; Fowler 2004; Galiatsatos 2004).

One of the advantages of CORONA is that it extends the historic data archive of remote sensing data to 1960. This is very helpful for the detection of long-term changes. As Donoghue (1999, 273) states: “At a global or regional scale remote sensing offers the only practical method of change detection”.

Bindschadler and Vornberger (1998) coregistered CORONA with AVHRR and SPOT data for the detection of changes. CORONA imagery afforded a direct view of the configuration of the ice sheet in the early 1960s, greatly extending the limited surface observations made between 1958 and 1959.

Tappan, Hadj, Wood, and Lietzow (2000) combined the geodetic and synoptic qualities of the ARGON photograph with the high-resolution CORONA photographs. They detected changes in land use and land cover by comparing CORONA and ARGON with Landsat imagery. Again, the historical value of CORONA is shown in this work. The photography depicted the area of west-central Senegal before the recent drought cycle, for which no aerial photos or other wide area surveys exist.

The above-mentioned examples of the use of CORONA data in change detection applications do not take advantage of the spatial resolution of CORONA. Schmidt (2004), Trelogan, Crawford, and Carter (2002), and Musaoglu, Bektas, Saroglu, Ustun, Kaya, Goksel, and Kandal (2005) have applied visual change identification between CORONA and IKONOS, CORONA and IRS 1-C panchromatic, and CORONA and SPOT-5 panchromatic respectively.

The work of Trelogan, Crawford and Carter (2002) also highlights the historical value of CORONA for the archaeological record, with the identification of buried archaeological remains that today are impossible to detect because of the extensive landscape modification. With the aid of CORONA, Cerasetti and Mauri (2002) detected archaeological evidence that shed light on the supply system of ancient outposts. Today this evidence is covered by vegetation that makes surveying impossible. Kennedy (1998) shows the historical value of CORONA imagery through examples of archaeological sites that today are flooded by lakes, which formed behind a succession of large dams along the river Euphrates.

The works of Altmaier and Kany (2002) and Palmer (2002) highlight the moderate cost of CORONA imagery and the capability to provide accurate enough information through simple and rapid processing approaches. The main focus of these works was on quantitative and qualitative information respectively.

The spatial resolution of CORONA makes it comparable to high-altitude aerial photography. Ur (2002; 2003), Kennedy (1998; 2000), Comfort, Abadie-Reynal, and Ergec (2000), Comfort and Ergec (2001), and Wilkinson (2003) highlight the importance of the CORONA imagery for the Middle East, because of the unavailability or limited availability of aerial photography. This advantage of CORONA goes beyond the Middle East area, and proved useful for example in Romania (Oltean 2000), Morocco (Altmaier and Kany 2002), Armenia (Palmer 2002), and other places in the world for which historical data like aerial photography or maps do not exist or are limited. A more elaborate approach for the application of CORONA imagery in landscape archaeology has been followed by Gheyle, Trommelmans, Bourgeois, Goossens, Bourgeois, De Wulf, and Willems (2004) in the Altai republic of southern Siberia, by Philip, Donoghue, Beck, and Galiatsatos (2002) in the Homs region of Syria, and most notably by the *Fragile Crescent Project* (Galiatsatos et al. 2009; Wilkinson et al. 2012) that covers almost half of modern Syria, including parts of Turkey and Iraq.

Because of its advantages, in particular its low cost and historical value, CORONA has been taken up avidly by archaeologists (Kennedy 2000). From the above applications, it is apparent that archaeologists mostly photo-interpret CORONA data. The main reason is that archaeologists lack the expertise to process satellite data, and thus the routine use of satellite data in archaeological approaches has been met with hesitation and ambiguity (Darja Grosman, pers. comm.). However, advances in information technology can stimulate changes in the field routine, and the combination of all available data in a multilayer analysis is essential (Schmidt 2004). When it comes to integration, the scale of the application defines the need for accuracy. The high-resolution sensors are more appropriate for the detailed mapping associated with archaeological sites. This demands high accuracy and as rigorous an approach as possible, always depending on the existing data.

3. METHODOLOGY

A dataset of thirteen CORONA frames is currently available within the ECP (Table 16.1). They are dated between November 1968 and September 1969 and have been acquired either for free or purchased through the United States Geological Survey (USGS).

Although CORONA series have been widely employed for archaeological purposes over the last decades, CORONA missions were conducted for military rather than mapping purposes (Beck et al. 2005, 295). Furthermore, the geometry of CORONA poses a challenge to a rigorous rectification, as there are about twenty-seven distortions (Slama, Theurer, and Henriksen 1980; for a list of efforts to create a rigorous approach see Galiatsatos 2004, 79–80). As a consequence, one of the major challenges concerns the procedure of geo-referencing the imagery in order to geolocate the single frames within an appropriate system of spatial coordinates and to allow metric measurements. The geo-referencing also makes possible to integrate the CORONA imagery with other spatial datasets in a GIS environment and to maximize data management and spatial analyses.

3.1. Rectification Technique

According to Ronald Ondrejka (pers. comm.) and Slama, Theurer, and Henriksen (1980), there is no need for ephemeris data as long as there is sufficient ground control. Therefore, many researchers tried to identify and use an appropriate basemap for the geo-rectification of CORONA photographs. Casana and Cothren (2008) used SPOT imagery; Galiatsatos, Donoghue, and Philip (2008) used IKONOS imagery; and Galiatsatos et al. (2009) used orthorectified Landsat (see also Tucker, Grant, and Dykstra 2004).

A fruitful procedure of geo-referencing CORONA photographs has been implemented for the region of Homs by Beck et al. (2005, 296–97; Beck et al. 2007, 166–67), based on the acquisition of Ground Control Points (GCPs) on the field by GPS system and high-resolution

IKONOS satellite imagery. Since it is not possible to acquire any GCPs on the field in the Ebla territory, currently the only chance is to use the other spatial datasets available for this region and cover the whole area under investigation.

The first attempt to georectify CORONA in ECP was made using as a basemap the mosaic of the Soviet topographical maps on a 1:100,000 scale, reprojected from Pulkovo 42 into a WGS 84 system (see Mantellini, Micale, and Peyronel, in this volume). This map series was dated a few years later than CORONA and it made easier the identification of the CGPs, in particular of road intersections and field corners. However, the results achieved were too inaccurate, with a mismatching between the GCPs of 150–200 m (Plate 21:1).

A second attempt was based on the recent satellite imagery provided by Google™ Earth Pro. The open-source software packages Shape2Earth and MapWindows (see Mantellini, Micale, and Peyronel, in this volume) make it possible to download from Google™ Earth Pro frames that are already geo-referenced and to mosaic all the frames in order to cover the area of interest (AOI). This way, either the single frames or the mosaic can be used as a basemap. In spite of the accuracy of the geo-referenced mosaic (Plate 21:2), landscape changes occurred during the almost fifty years between CORONA and Google™ Earth imagery, in particular in the shape and size of the fields, limited the reconnaissance of GCPs. This resulted in an inaccurate rectification (Plate 21:1b), emphasized also by the partially wrong overlaps in some parts of the mosaic (Figure 16.1).

The lack of high-resolution satellite imagery like IKONOS or Quickbird covering the whole ECP area forced us to choose a different dataset for geo-referencing the CORONA photographs. The most suitable solution has been the use of some of the rectified CORONA series made available by the *Fragile Crescent Project* (Galiatsatos et al. 2009) and processed at the Geoinformatics Laboratory of the Archaeology Department at Durham University (Wilkinson et al. 2012). Four scenes with ID DS1107-1122DA056-059

dated July 31, 1969 (Plate 22), which completely covered the area investigated by ECP, were used as basemap for the rectification. The landscape features being practically unchanged in the short time between the series allowed to identify a high number of matching GCPs and thus to rectify the CORONA photographs very easily and rapidly.

To assess the final CORONA geo-rectified frames, we overlaid them with WorldView-2 imagery that was acquired later and got rectified with the application of RPC (rational polynomial coefficients) only. The result showed a very good match between the two datasets (Figure 16.2).

3.2. Detection of Sites and Anthropogenic Features

One of the main goals of ECP is to provide an archaeological assessment of the area under investigation. An approach combining different spatial datasets has therefore been applied in order to improve the data recorded during the early surveys carried out in the region. This first assessment resulted in the identification of eighty-five sites and seventy potential sites (see Mantellini, Micale, and Peyronel, in this volume).

Among these spatial datasets, CORONA satellite imagery has played a key role in the identification of anthropogenic settlements and landscape features, mostly thanks to the wide experience matured during the last decades through numerous regional studies in the Near East (see, among others, Kennedy 1998; Philip, Donoghue, et al. 2002; Ur 2003; Casana and Cothren 2008; Menze and Ur 2012; Wilkinson et al. 2012).

CORONA photographs were used for a double purpose. On the one hand, they allowed to validate the presence of thirteen tells not visited on the field, for which either the topographical maps only reported the toponym “tell” without the symbol of the anthropogenic hill or the symbol likely referring to the tell was unclear and not associated to any “tell” toponym. On the other hand, CORONA imagery was employed, together with the topographical maps, to attempt the identification of further potential sites (PS)

and anthropogenic features in the landscape that require a ground control. In both cases, this preliminary detection was partially verified against the other satellite datasets that cover the whole area of investigation such as Google™ Earth imagery (Figure 16.3).

The first category includes thirteen tells (Table 16.2) and refers to some of the sites already included in the preliminary inventory. As showed in Table 16.2, most of the tells were recorded over the Soviet topographical maps on 1:100,000 and 1:200,000 scales. By contrast, it must be noted that the French maps do not cover the whole ECP area.

The inspection through Google™ Earth Pro imagery of the tells revealed by the CORONA photographs showed that nine of them are still preserved, whereas four sites have been destroyed. Tell Minmar (EC 053) was bulldozed to allow a likely military installation (Figure 16.4); Tell es-Shikh (EC 098) and a nameless tell (EC 054) were flattened for agricultural purposes (Figure 16.5); and a nameless site (EC 092) was also destroyed to extend the cultivations, and its location is easy detectable on the ground because of the dark soil mark.

The second category concerns potential archaeological records distributed in the area under investigation and detected by combining CORONA satellite imagery and topographical datasets. As occurred for the first category, these potential sites too were partially verified throughout Google™ Earth Pro imagery in order to establish if they can be the result of human occupation and activities rather than a wrong interpretation of the CORONA photographs.

The potential sites are seventy and they include five different types: tells, ruins, off-sites, kites, and canals (see Table 24.6 and Plate 14 in Mantellini, Micale, and Peyronel, in this volume). However, they remain classified as “potential” until the field validation.

Because of ECP’s main interest in the EBA settlement pattern, the location of the mound-shaped, typical pre-Classical sites appeared as

an important task to be accomplished. The potential tells are thirty-five and they were mainly located with the use of toponyms found on the topographical maps. Thus, a first evaluation through CORONA photographs and Google™ Earth imagery suggested the existence of three more tells. The first (PS 39) is a nameless site not reported on the topographical maps but clearly visible in the CORONA imagery (Figure 16.6). It is an irregularly shaped site of about 2 ha in size, located on the eastern side of the Matkh depression, 1.2 km to the west of the village of el-Vasita. The tell has been destroyed since the acquisition of the CORONA photographs; however, its location is quite well detectable by a light soil mark on Google™ Earth Pro, especially on the image acquired in 2007. The second site (PS 64) might be another nameless tell located 1.1 km east of the village of Kalbak (Figure 16.7). The tell has an almost circular shape and it measures less than 1 ha in size. In contrast to the former tell, it is still in place and, according to Google™ Earth, in a good state of preservation. Interestingly, the analysis of CORONA imagery has likely allowed the detection of Tell Tabarrah (PS 13), reported by de Maigret (1978, fig. 10) as belonging to the Chalcolithic-EBA I-III settlement pattern of the Ebla region but neither described by the author himself nor mapped on the French and Soviet map series (cf. Mantellini, Micale, and Peyronel, in this volume). According to de Maigret, the tell is apparently located in the middle of the Matkh depression, in the strip of land that bisects the lake during the dry seasons (Figure 16.8). On the CORONA photograph the site appears to be formed to the north by an almost circular part of less than 2 ha, and to the south by an elongated part running from north to south and measuring 350 x 100 m in its widest section. The latter part is not visible on the Google™ Earth Pro imagery because it was destroyed during the past decades.

Two potential sites bearing the toponym of “tell” are located at the top of natural hills and thus establishing their conditions requires a ground survey (Figure 16.9). The first is Tell Mashmale (PS 01) at the southern fringe of the Jebel Shbeyt, almost in the southeastern corner of the ECP area

of investigation; the second is Tell Ras-Abyad (PS 24), at the foothill of the Jebel Zawayeh, to the opposite side of the ECP area. The former is associated to a circular feature perhaps related to an archaeological site.

PS 19 is reported on the Soviet map at 1:100,000 scale with the typical symbol of the tell together with its elevation above the ground (2 m). The clues indicate the presence of a tell, while the CORONA photograph shows the area covered by ruins and structures that are perhaps related to Classical settlements.

The identification of probable off-sites, too, can benefit from the use of CORONA imagery. Seven off-sites can be easily detected by means of crop marks. PS 66 and PS 67 are located 1.1–1.2 km to the south of the southern wall of Tell Mardikh (Figure 16.10), whereas PS 68 (Figure 16.11) is some 150 m to the east of Tell el-Hasmi (EC 093). Both suggest the presence of dispersed settlements related to the main centre, namely the tell. PS 06 is a light circular crop mark 1 km to the northwest of the village of Tell Dadin. The presence of Tell Dadin (EC 057) very close to the homonymous village seems to invalidate the hypothesis about the presence of a second tell that would have been destroyed before the acquisition of the CORONA photograph (Figure 16.12).

Finally, two other nameless features hitherto classified as off-sites are worth mentioning. The first is PS 03, which appears on the French map on a 1:50,000 scale as a non-natural feature within the watered depression to the north of Tell Bajer. There is no toponym or symbol associated with it; however, the fact that a small cluster of modern houses were built here might suggest a place that is raised above the surrounding ground. PS 04, located 4.2 km to the southeast of Khan es-Sebil, is also not mapped on the topographical maps. The site’s light color and almost circular shape suggest the presence here of a dispersed settlement, if not a destroyed tell.

The last subcategory of potential sites refers to likely anthropogenic features, in particular to the hydraulic structures used either to supply water to the settlements or to irrigate the fields.

The features of interest here are three. The most interesting (PS 08) is located on the central-western foothill of Jebel el-Hass and is highlighted by a dark soil mark in the shape of two or three lines some 800 m long, running from southeast to northwest. They seem to deviate the water of either a seasonal wadi or a run-off, and they might be related downstream to the presence of a possible settlement (PS 26) buried by the village of Tell el-Kattabat. Upstream, 2.6 km southeast of the village, a feature with an almost oval shape suggests the presence of a corral or possible “kite” (PS 20) (Figure 16.13).

Finally, two cases are worth of mentioning, albeit they probably refer to Classical rather than pre-Classical settlements. The first (PS 36) is located on the eastern foothill of Jebel el-Hass and it appears to be a relatively big area extending for some 100 ha over the whole alluvial fan (Figure 16.14). It has a main centre, rectangular in shape and measuring 120 x 70 m. The light layout can probably indicate earthen dwellings, whereas the dark layout may mark the limits of the fields built with basalt stones. Because of its location, the settlement might be considered in relation with the Jabbul Lake rather than with the proper territory of Ebla.

The second site (PS 07) is located 4.2 km southeast of Jarjanaz, thus outside of the ECP area of investigation; however, it is worth mentioning because of its size and complex layout (Figure 16.15). In contrast to the former settlement, here there is no main settlement overlooking the area, which is indeed characterized by a geometrical pattern defining fields and perhaps dwellings. The site seems to be partially buried under modern cultivated fields that are affecting the preservation of the sites; therefore, a field survey would be vital to verify these findings.

4. RESULTS AND DISCUSSION

The geo-rectification of the CORONA frames proved to be difficult and challenging. Different methods were applied and the use of an already rectified CORONA product proved to be the best one, even though the process could have

been expected to multiply the error as the basemap was the product of geo-rectification against an orthorectified Landsat panchromatic imagery. The Russian maps were found to be too crude and the GoogleTM Earth Pro snapshots too distant in time. Admittedly, some field GPS measurements would provide a better estimation for the precision of the geo-rectification.

CORONA satellite imagery has consistently increased the number of archaeological sites in the area under investigation by ECP in term of both known and potential sites. It is of course impossible to evaluate this increase in relation to the chronological development of settlement patterns without the information that can be acquired on the field. Nevertheless, the remote sensing analysis seems to confirm the absence of large irrigation works, thus confirming the dry-farming character of cultivation in this area. In this regard it is interesting to note that the “linear hollows” typical of the dry-farming environment in the northern Jezirah (Wilkinson 1993a, 548) are almost missing in the territory of Ebla. The traces visible outside the gates of Tell Mardikh/Ebla and around Tell Sheikh Mansur (EC 005), and the few likely traces of canals mentioned above are just an exception to this pattern. The very few likely hydraulic works are located in a specific foothill context and they seem to be related to the water supply of a single settlement and the irrigation of the small plots around it. The high-resolution satellite imagery also detected potential off-sites and destroyed tells that require ground validation.

5. CONCLUSIONS

As there is no off-the-shelf software package offering a rigorous approach to the geo-rectification of CORONA photography, the identification and use of an appropriate basemap is vital. This will provide some guidance to the ground control, which can be strengthened with the use of GPS or other ground measurements.

The territory of Tell Mardikh/Ebla showed the successful application of CORONA satellite imagery in both the validation and the

identification of archaeological sites. This is an issue shared with other parts of the world where big scale maps and air photos are unavailable or difficult to obtain (Kennedy 1998, 555; Philip, Donoghue, et al. 2002, 109).

The approach combining CORONA photographs with toponyms from the topographical maps and the modern Google™ Earth Pro imagery was very useful in detecting the possible existence of archaeological sites as well as in identifying potential sites that must be validated by specific

field control. The satellite imagery and the maps may be providing only some indication of the existence of archaeological sites, but they can assist in the fieldwork planning and can provide a larger picture of the archaeological landscape.

NOTES

- 1 Galiatsatos has written § 2; Mantellini § 3. Introduction, Results and Conclusions have been written jointly.

ENTITY ID	ACQUISITION DATE
DS1052-2122DA/DF045-048	September 30, 1969
DS1107-1122DA056-059	July 31, 1969
DS1105-1009DF012	November 4, 1968
DS1105-2267DA020	November 20, 1968
DS1105-2267DF013-015	November 20, 1968

Table 16.1. Dataset of CORONA satellite imagery used within the ECP.

SITE		MAPS					GOOGLE™ EARTH PRO
ID	NAME	TOPONYM	SYMBOL	FFL 1:50,000	SOVIET 1:100,000	SOVIET 1:200,000	
EC 017	Tell Zaytun	X	X	X	X	X	X
EC 025	Tell Zafar	X	X	X	X	X	X
EC 021	Tell Sharkiv	X	X	n/a	X	X	X
EC 040	Tell Daman	X	X	n/a	X	X	X
EC 052	-	-	X	n/a	X	X	X
EC 053	Tell Minmar	X	X	n/a	X	X	destroyed
EC 054	-	-	X	n/a	X	X	destroyed
EC 055	-	-	X	n/a	X	X	X
EC 059	-	-	X	n/a	X	X	X
EC 091	Tell Mamo	X	-	n/a	X	X	X
EC 092	-	-	X	n/a	X	X	destroyed
EC 094	Kafar Battikh	-	-	n/a	-	-	X
EC 098	Tell es-Shikh	X	X	X	X	-	destroyed

Table 16.2. Sites detected on the topographical maps and validated through CORONA satellite imagery.

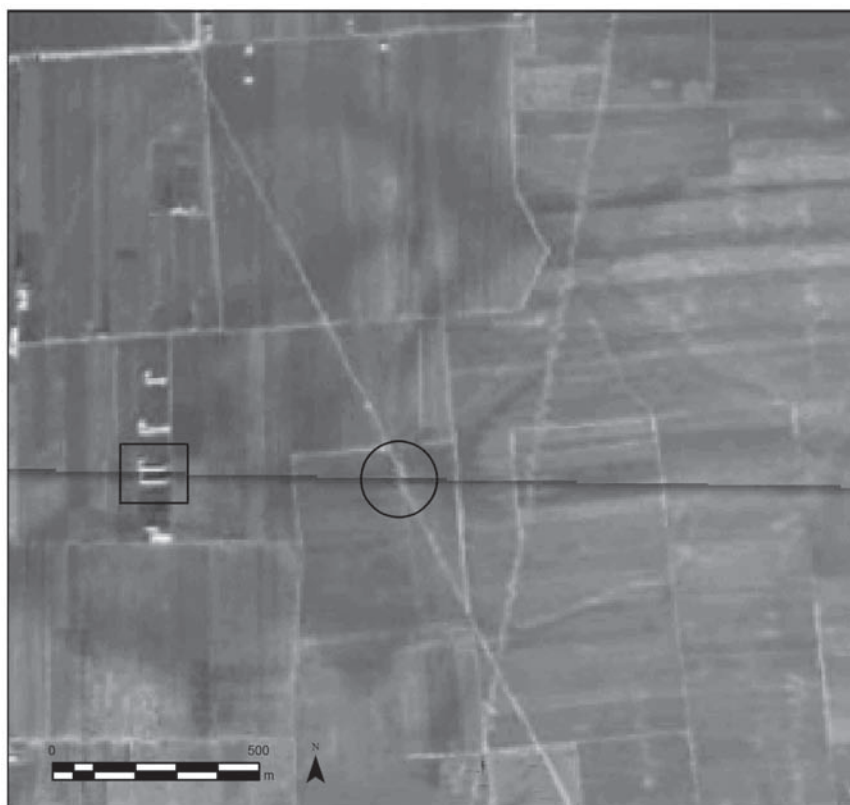


Figure 16.1. Example of wrong overlapping in the mosaic of Google™ Earth Pro frames: building (in the square) and road (in the circle).

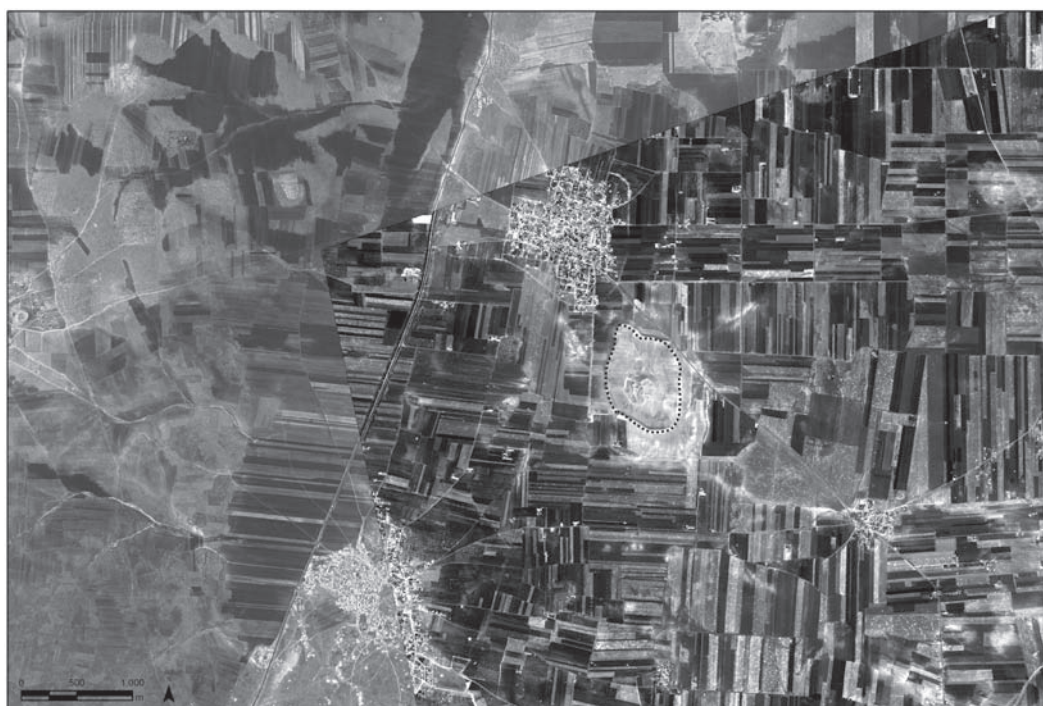


Figure 16.2. Matching between CORONA photograph and WorldView-2 satellite image. The black dotted lines refers to the contour of Tell Mardikh/Ebla drawn on the CORONA photograph.

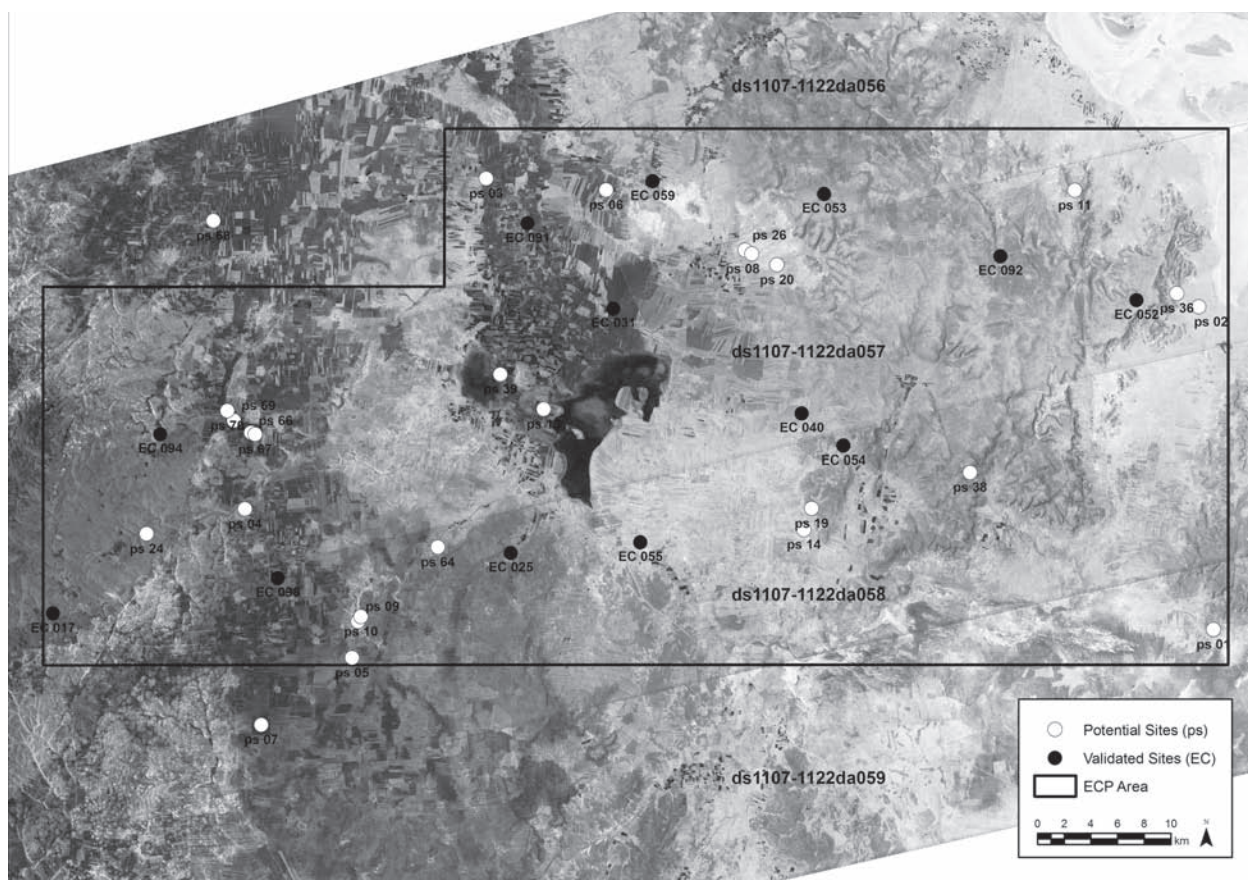


Figure 16.3. Map of the main known sites (EC) validated and potential sites (PS) detected by using CORONA imagery.

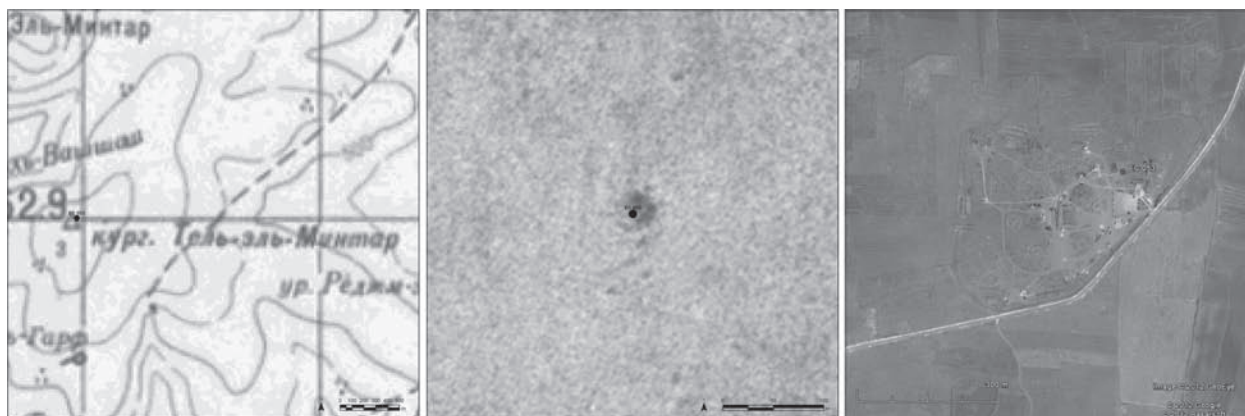


Figure 16.4. Identification of Tell Minmar (EC 053) on Soviet map at 100,000 scale, validation on CORONA photograph (tell preserved) and Google™ Earth Pro imagery (tell destroyed).

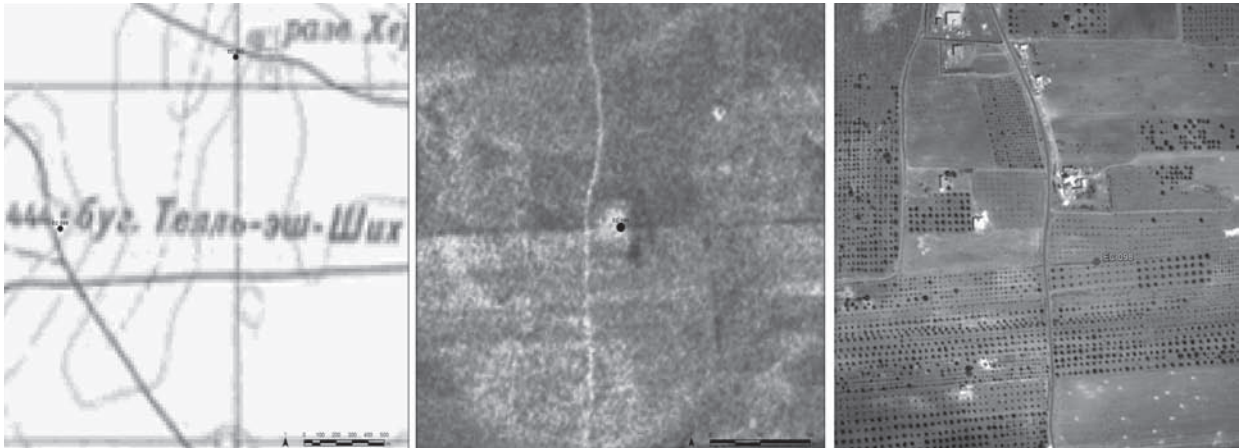


Figure 16.5. Identification of Tell es-Shikh (EC 098) on Soviet map at 100,000 scale, validation on CORONA photograph (tell preserved) and Google™ Earth Pro imagery (tell destroyed).

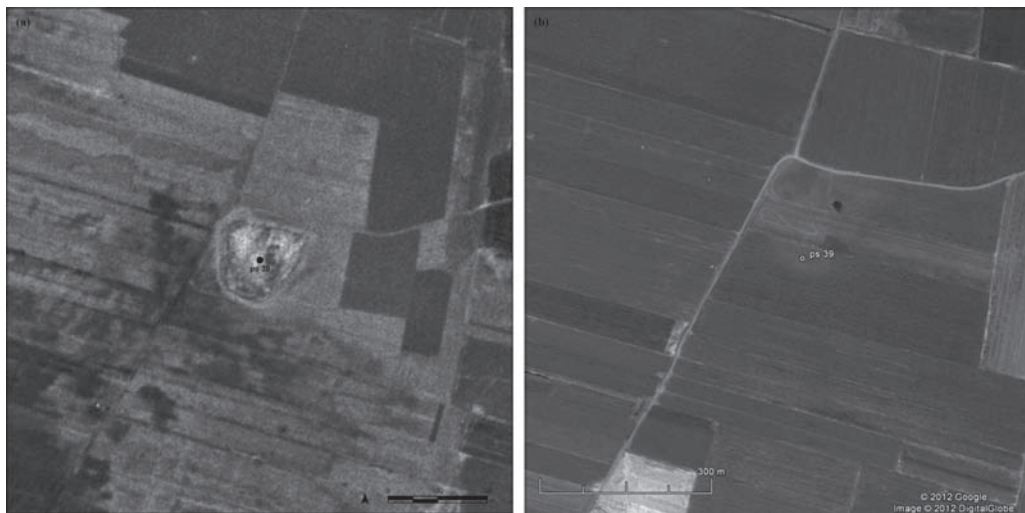


Figure 16.6. Detection of a potential tell (PS 39) on the CORONA photograph and its mark on Google™ Earth Pro imagery.

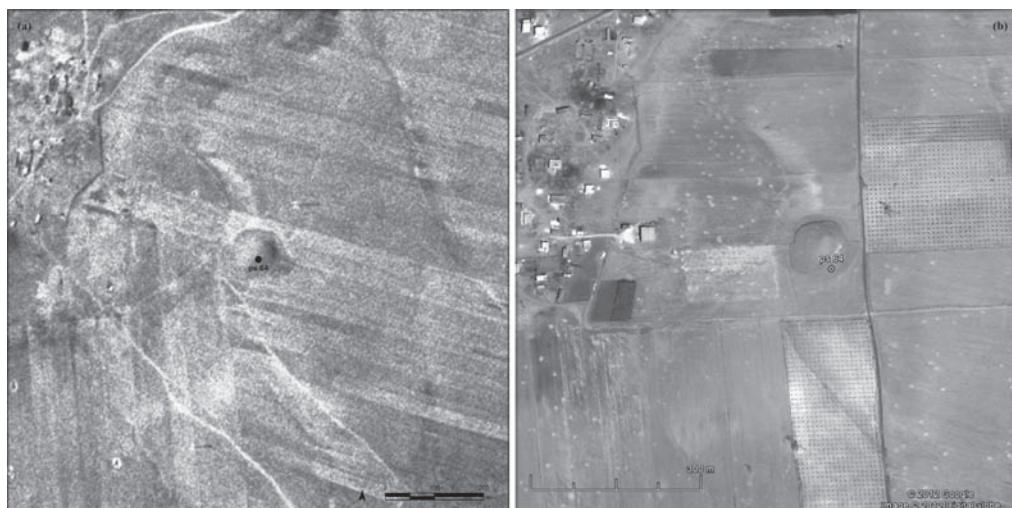


Figure 16.7. Detection of a potential tell (PS 64) on the CORONA photograph and on Google™ Earth Pro imagery.



Figure 16.8. Possible detection on CORONA imagery of Tell Tabarrah (PS 13) mentioned in de Maigret (1978, fig. 10).

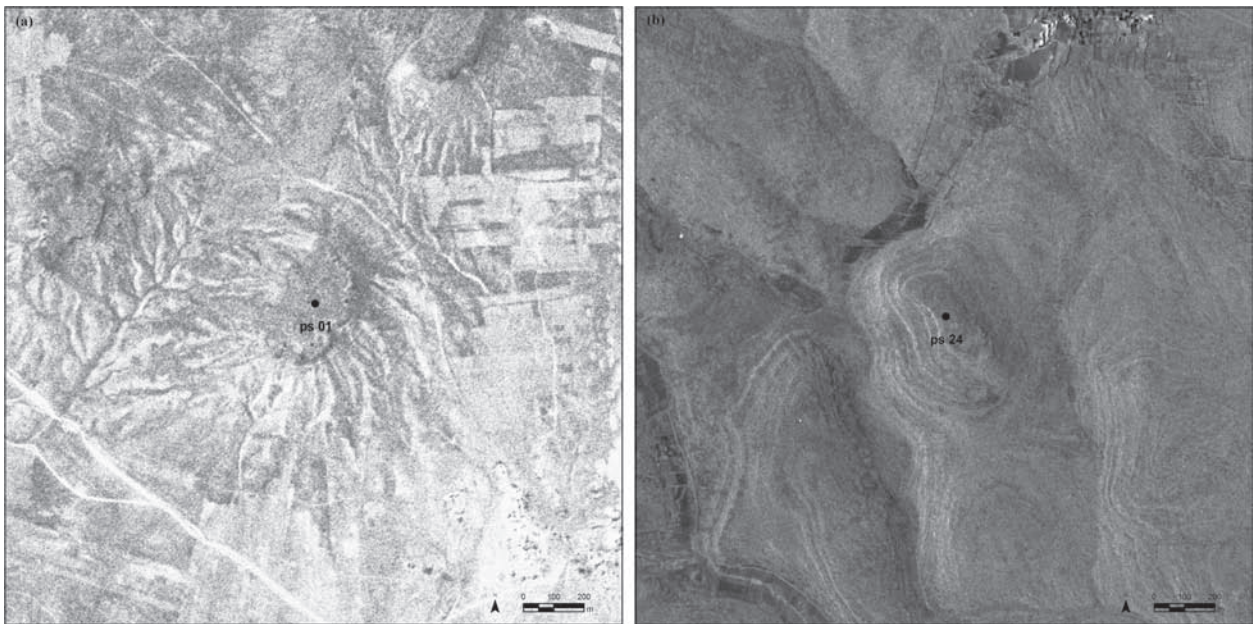


Figure 16.9. Two potential sites located on a CORONA image on the top of a natural hill: a. Tell Mashmale (PS 01); b. Tell Ras-Abyad (PS 24).

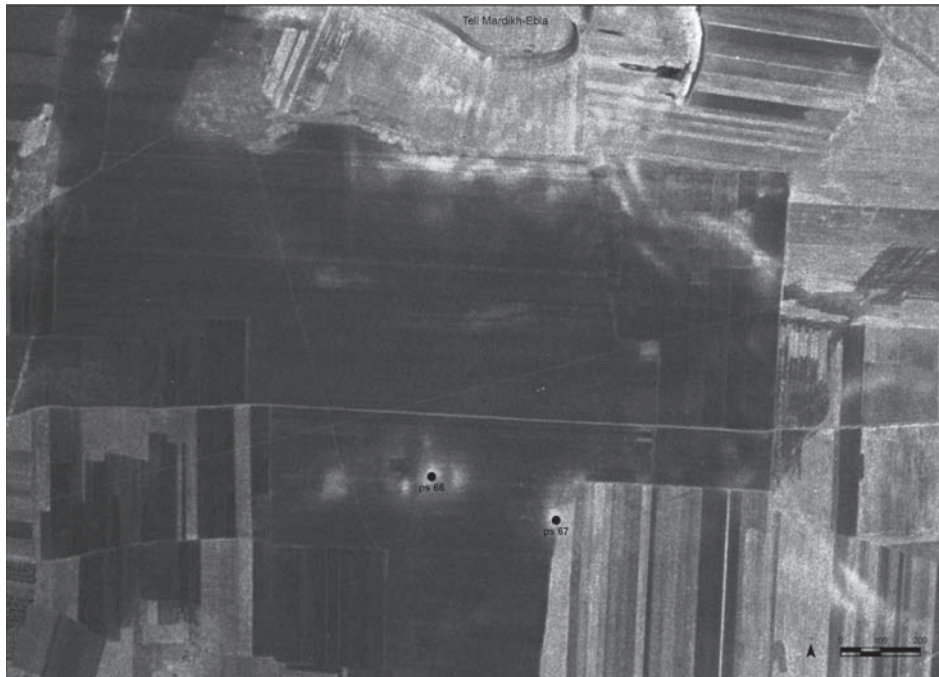


Figure 16.10. Two potential off-sites (PS 66 and PS 67) one kilometer to the south of Tell Mardikh/Ebla (CORONA imagery).

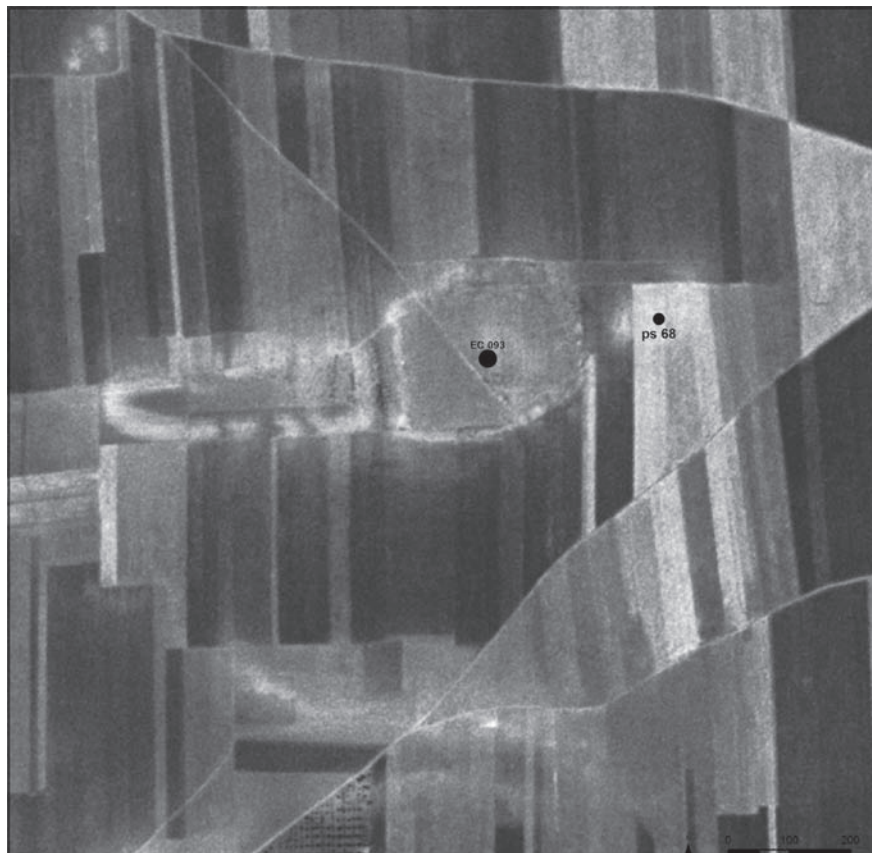


Figure 16.11. A potential off-site (PS 68) close to Tell el-Hasmi (EC 093) in a CORONA image.

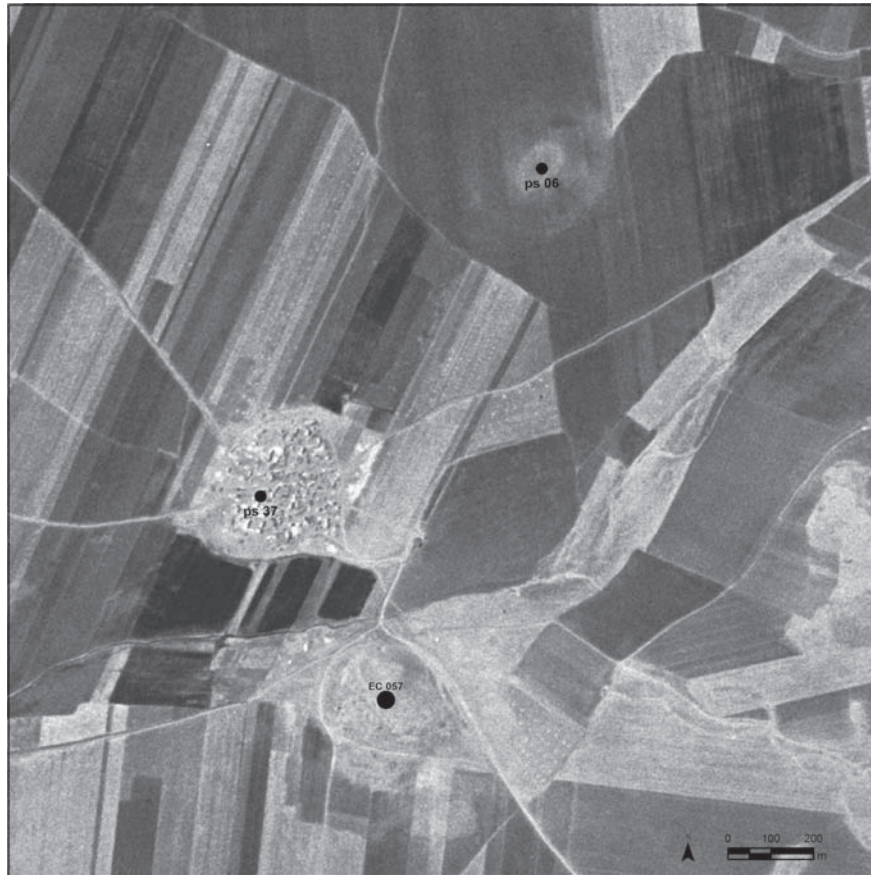


Figure 16.12. Tell Dadin (EC 057) with a potential site in the homonymous village (PS 37) and a potential off-site (PS 06) to the northwest of the village (CORONA imagery).

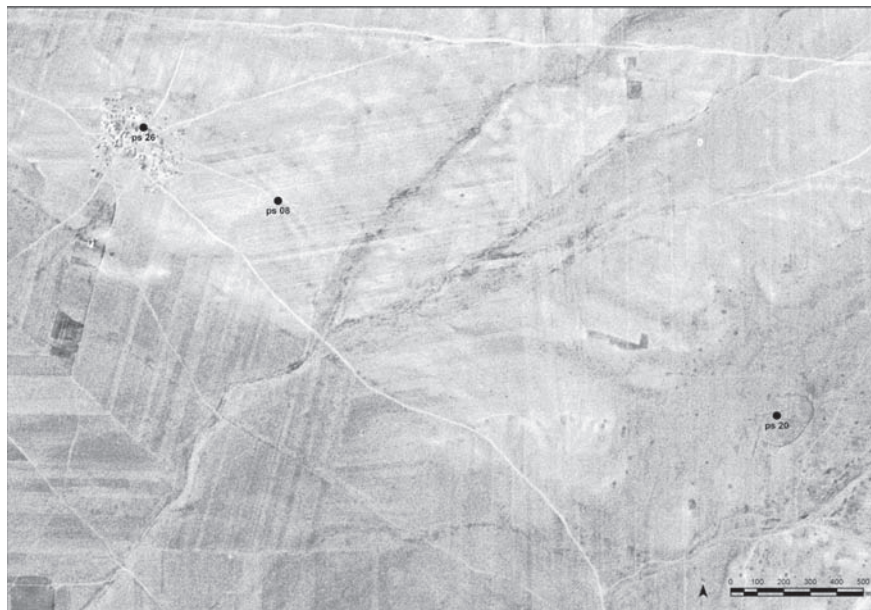


Figure 16.13. Detection of different types of potential sites on CORONA: tell/site within the modern village (PS 26), a short canal (PS 08), and a “kite” or enclosure (PS 20).

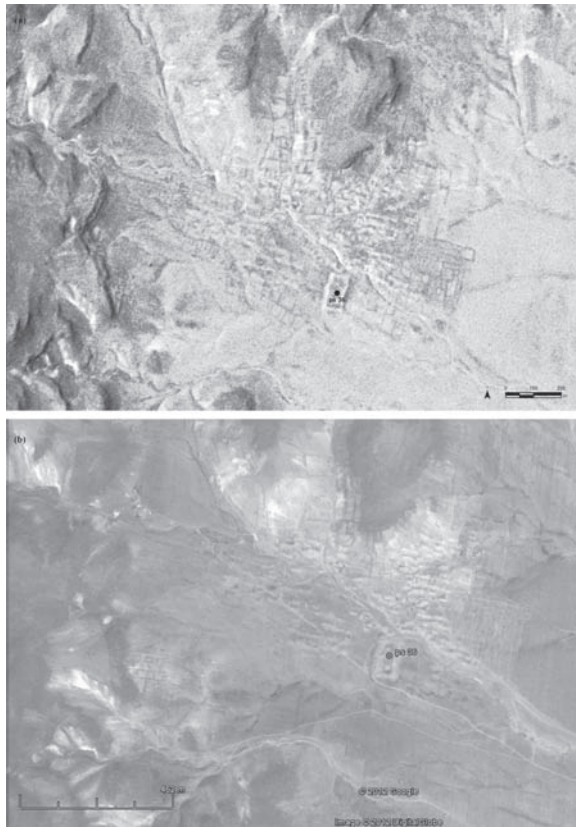


Figure 16.14. Detection of a potential Classical settlement (PS 39). The layout of dwellings and possible fields is clearer on CORONA photograph (a) than on Google™ Earth Pro imagery (b).

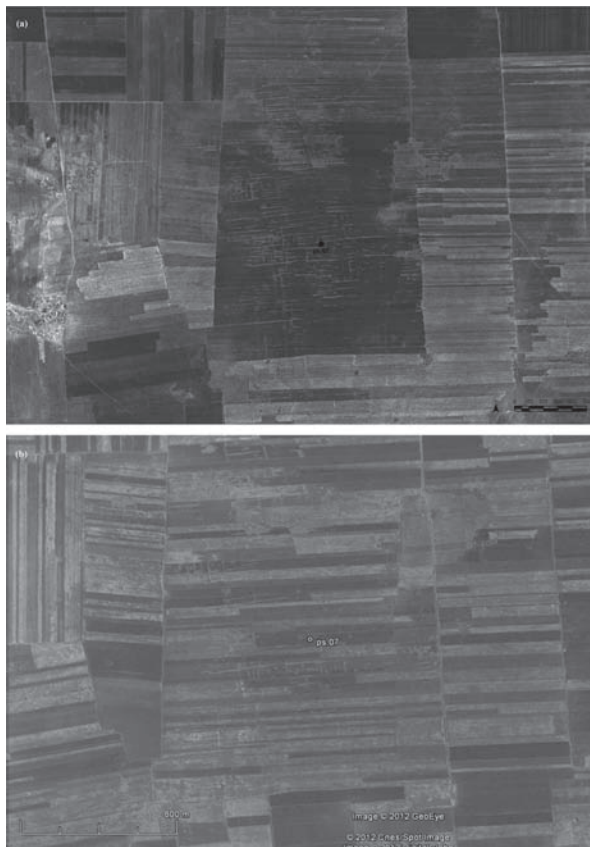


Figure 16.15. Detection of a potential Classical settlement (PS 07). The layout of dwellings is clearer on CORONA photograph (a) than on Google™ Earth Pro imagery (b).

CHAPTER 17

FROM WETLAND TO DESERT

A Geomorphologic Approach to the Eblaite *Chora*

L. Cantelli, V. Picotti, and V.M.L. Martina

1. INTRODUCTION¹

The Middle Holocene human settlements in the Near East were strictly influenced by the availability of water, and specifically of precipitation patterns allowing cereals farming (e.g., Staubwasser and Weiss 2006). Several studies documented abrupt climatic oscillations in the Near East, particularly around the Middle Holocene, a time of climatic variability connected with the increasing variability of El Niño Southern Oscillation (ENSO) in the Pacific (see Williams et al. 2008).

One of the best documented climatic oscillations occurred between 4.2 and 3.9 kilo years (ky) and severely impacted the Near East, bringing about abrupt changes in settlement dynamics (for a review, see Weiss, in press). One effect of this crisis was the abandonment of the main cities toward more scattered settlements in the vicinity of perennial water sources. In the case of Ebla, Weiss (in press) suggested the at least partial abandonment of the city and the colonization of a nearby humid area. The latter is the endorheic basin of Matkh, presently no more than a large cultivated flat with a residual swamp (Madekh swamp) at the end of the Quweiq river, where, at around 4 to 3.9 ky, a new settlement occurred: Tell Tuqan (Baffi and Peyronel, in this volume).

Presently, the climate of the region is semiarid, characterized by a strong negative gradient of precipitations from the Mediterranean to the east. The Eblaite *chora* embraces, therefore,

different vegetation belts, Eu-Mediterranean to the west, steppe to desert to the east. This makes the region particularly sensitive to even small climatic variations, such as those occurred in the Middle to Late Holocene.

Different climatic regimes in the third millennium B.C. favored the development of farming in the Eblaite *chora*, as documented by the size of the city as well as by the clay tablets from the Royal Archives from 2300 B.C. Recent paleobotanical studies (Fiorentino et al. 2008) showed that Ebla, like many other sites in the Near East, enjoyed a higher precipitation regime, increasing at the beginning of the third millennium B.C., peaking around 2500 B.C., and later decreasing, leading to an aridity crisis around 2200–2100 B.C. After 1500 years of aridity, wetter conditions reestablished around 600 B.C. (Figure 17.1).

We discuss here the preliminary results of a survey that took place in June 2010 within the Ebla Chora Project, aimed at reconstructing the environmental conditions around Ebla and its surrounding territory. We present new data on the mean precipitation at the beginning of the Middle Bronze Age, which will allow a better discussion of the overall trend of climatic change at the end of the 4.2 to 3.9 ky climatic crisis. We conducted a geomorphologic study of Ebla and surroundings in order to find evidence of the past precipitation regime, to try to quantify it, and to properly frame it within a geoarchaeological context.

2. GEOMORPHOLOGICAL EVIDENCE FOR THE MATKH PALEOLAKE

The depression of Matkh is located east of Ebla and is an endorheic basin draining water from the surrounding plains, especially from the north, where the Quweiq river catchment develops.

Several small dendritic channels cut the calcareous substrate east of Ebla, defining a dense network, even denser than required from the present-day precipitation regime. Toward the Matkh plain, the incision of these channels sharply disappears in two steps, the higher one located at around 275 m a.s.l. and the other at 257. On the flat bottom of the plain, at around 250 m, the reddish soil more or less colluviated that covers the hill slopes is replaced by a thick succession of grayish muddy soils, documenting the settling of fine-grained sediment in still waters.

These features (Figure 17.1) are interpreted as traces of an ancient base level for the channels at a time in which the present-day plain was covered by a lake. Increased precipitations are required to explain the drainage density and incision and the persistence of a perennial lake. The higher lake level formed in an unknown prehistorical time (Last Glacial Maximum? Tardiglacial? Climatic optimum?), whereas the lower one was most probably present at the time of development of Tell Tuqan, that is after 4 ky (Baffi and Peyronel, in this volume). In fact, the mound forming the settlement (Figures 17.2–3) shows features that document the presence of a lake level at 257 m a.s.l.. The southeastern slope of the tell appears as a rectilinear stretch instead of circular as the rest of the tell: this suggests that this slope was probably affected by erosion from wave action driven by strong southeastern winds. A second, more prominent feature is the step in the slope at 257 m (Figure 17.3), still visible in aerial images (Figure 17.2), due to the presence of coarser grained sediments. These features are interpreted as the wave-cut abrasion terrace of the windward slope of the tell, facing a lake at 257 m.

3. ARCHAEOLOGICAL EVIDENCE FOR THE MATKH PALEOLAKE

The southeastern city gate of Tell Tuqan is dated to 3.9 to 3.8 ky and is formed by blocks of limestone likely deriving from the Cretaceous quarries still active west of Idlib. The location of this door is weird, at the middle of the slope, neither on the plain nor on top of the tell. The limestone blocks of the lower part of the door are covered by a thin black crust and affected by dissolution features such as corrosion pits (*kamenitze*, Figure 17.4). These freshwater dissolution features occur only on the blocks below 257 m and document their permanence below the lake level, where they were bioeroded. Our interpretation, therefore, is that the door was actually a dock, but its location on the windward slope of the tell is intriguing.

In the Corona satellite pictures (Figure 17.5) taken around fifty years ago, it is clearly visible a lunate embankment southeast of the mound of Tell Tuqan. This embankment has a flat top, likely elevated around 5 to 10 m over the Matkh plain. It creates a narrow gulf of around 80 m of width, on the bottom of which lay the dock.

We therefore interpret this embankment as an artificial dyke that protected the dock, both from wind and from possible attacks. In fact, till the present days, the worst storms have come from the southeast, with strong winds carrying desert dust called Simoom (or Khamsin, see Figure 17.5: right). Interestingly, we observed a dyke outside the ramparts of Ebla protecting its southeastern side too. Also in this case, we tentatively suggest that one of the main reasons for this protection was the creation of a wide area protected from the storms (Figure 17.5: left; but see also Mantellini, Micale, and Peyronel, in this volume).

4. HYDROLOGICAL ANALYSIS AND RECONSTRUCTION OF THE PRECIPITATION REGIME AT THE ONSET OF THE MBA

At least between 3.9 and 3.8 ky BP, Tell Tuqan was an island facing a lake of about 86 km² (see Plate 23). Tell Tuqan was not the only artificial island, as it is evident from the analysis of the

DEM, which shows circular and elongated mounds.

The aim of this paragraph is to determine the hydrological regime necessary to sustain the Matkh lake reservoir. The Matkh lake is endorheic, and there are no streams outflowing from it. The previous geomorphological analysis showed evident signs of a lake level 257 m a.s.l. at the beginning of the MBA, which means a maximum water depth of about 7 m. Assuming an invariant topography, it is therefore possible to compute the volume of water contained in the lake reservoir. A conceptual hydrological model can help estimate the hydrological balance and the hydrological flows necessary to sustain that reservoir volume.

Given the limits imposed by the lack of data and the uncertain knowledge of the main hydrological components in that period, the results are not reliable in quantitative terms, but they assume a qualitative value especially in comparison with the current hydrological regime.

5. CONCEPTUAL MODEL

The hydrological processes are generally complex, and particularly so in a semiarid region as the Ebla *chora* (Michaud and Soraoshian 1994). The main processes to be considered are precipitation, infiltration, surface runoff, land evapotranspiration, and lake evaporation. A full physically based modeling of these processes would require knowledge of the system and data that are not available for the period under analysis. Therefore we propose here a conceptual model to capture the main features and dominant processes at the catchment scale.

In a semiarid climate the limiting, we could say the controlling, factor in terms of water balance is water availability, i.e., precipitation (Dingman 1994). As a matter of fact the energy factor—in its two hydrological components, evapotranspiration and evaporation—is potentially greater, but it is limited by the actual availability of water in the soil, which depends directly on precipitation. This is also implicitly true in the definition

of semiarid climate based for instance on the Budyko's Aridity Index (Budyko 1958). The Aridity Index is defined as

$$AI = \frac{P}{PET} \quad (1)$$

where AI is the Aridity Index ranging from 0 (Hyperarid) to 1 (Hyperhumid); P is the annual Precipitation; and PET is the annual Potential EvapoTranspiration. For the semiarid climate the Aridity Index ranges from 0.2 to 0.5, which means that precipitation is between 20 percent and 50 percent of the amount that could potentially be evapotranspired at that level of available radiation energy.

Being precipitation the limiting factor, the climate, the vegetation, and the hydrological regime are directly and highly controlled by it. Therefore, also the reservoir volume is controlled by precipitation. At the same time, variation in radiation, and hence in land evapotranspiration and lake evaporation, is not that influential. For this reason, in our analysis we could assume that the Potential Evapotranspiration or Evaporation was the same in the past as is in the present without affecting heavily the reliability of the analysis. In this regard, a factor that should be considered with more care, maybe in further analyses, is the influence of vegetation on the hydrological cycle.

The water balance of the lake could be represented by the following simple equation:

$$\frac{\Delta V}{\Delta T} = Q - E - I \quad (2)$$

where ΔV is the change of the reservoir volume; ΔT is the time interval for the analysis, here equal to one month; Q is the mean monthly inflow discharge coming from the upstream catchment; E is the mean monthly evaporation rate of the lake; and I is the mean monthly infiltration rate from the lake.

In our survey, we checked the surface deposits of Matkh basin around Tell Tuqan and found some meters of fine-grained deposits (mud) mostly deriving from deposition in still water, in particular from settling. Given the characteristics of the superficial sediment, we neglected the infiltration component.

In order to compute correctly the discharge from the upstream catchment, one should preferably take into account all the main hydrological components. However, given the already discussed limits imposed by the case, we simplified the processes at the catchment scale by means of the following equation:

$$Q = (1 - \phi)P - AET \quad (3)$$

where ϕ is the average infiltration rate in the soil; P is the average monthly precipitation; and AET is the actual evapotranspiration, which is approximated as being equal to ϕPET , Potential Evapotranspiration.

By means of the equations (2) and (3), it is possible to compute the water balance at the catchment scale and also the water volume in the lake reservoir.

6. RESULTS OF THE HYDROLOGICAL ANALYSIS

In scientific literature, there are several works on the estimation of current hydrological flows (evaporation, evapotranspiration, and precipitation). For the aim of our analysis it is important to know the current water balance in order to evaluate its level during the Bronze Age.

Fiorentino et al. (2008) estimated the present average annual precipitation to be about 380 mm (Figure 17.6). Other works (Kaniewski et al. 2011) confirmed this data. The absent lake makes also evident that with the current amount of precipitation the lake is not sustainable, because the evaporation rate is much higher than the precipitation rate. We then tried to compute the additional amount of precipitation necessary

to sustain a lake reservoir. As we discussed before, the volume of the reservoir can be computed assuming that the topography (the lake bed) has not changed. For Evapotranspiration we assumed the values suggested by Weiss and Menzel (2008), and for Evaporation those suggested by Kattan (2008). The following table reports the input data we used (Table 17.1).

VARIABLE	VALUE
Catchment area (km ²)	7989
Reservoir area (km ²)	86
Reservoir volume (km ³)	5.74
Mean reservoir depth (m)	66.744
Mean runoff coefficient (-)	0.159
Annual potential evaporation (mm)	2217.2
Annual potential evapotranspiration (mm)	1978.2

Table 17.1

Using equations (2) and (3) is then possible to compute the additional precipitation necessary to sustain the reconstructed lake volume during the MBA (Table 17.2).

To sustain a lake at the elevation of 257 m, a surplus of 186 mm of annual precipitation was needed in addition to the present-day 380 mm, for a total of 566 mm/y.

7. CONCLUSIONS

The preliminary survey of the Eblaite *chora* provided new data on the existence of the Matkh lake at 257 a.s.l. at the beginning of the MBA. The lake has been identified based on both geomorphological and archaeological evidence. The settlement of Tell Tuqan was built as an artificial island, with a dock protected from the storms by a lunate embankment. The latter was likely built after the storms directly struck the slope of the tell long enough to erode and rectify the slope and to cut into it a wave-cut terrace, still visible on the field.

Our hydrological calculations suggest that around 3.9 to 3.8 ky, the precipitation regime was still higher than today, for a total of 566 mm/y. This

result contrasts with previous reconstructions, such as the one by Fiorentino et al. (2008), which suggested for the beginning of the MBA a lower precipitation regime than the current one.

If confirmed, our results suggest that, at the end of the 4.2 to 3.9 ky crisis, the precipitation regime in this part of the Near East was higher than previously thought. Further research is needed to evaluate if this regime was sufficient for dry agriculture, therefore sustaining the

recolonization that seems to have taken place at the beginning of the MBA.

NOTE

- 1 The Ebla Chora Project gratefully acknowledges the support of the European Research Council (FP7–IDEAS AG 249394, Principal Investigator Prof. Paolo Matthiae). The Direction Générale des Antiquités et des Musées - Damascus (Syria) also deserves our gratitude for its friendly cooperation.

	PE (mm)	PET (mm)	MWC (%)	AE (mm)	AET (mm)	P _{add} (mm)	Q (m ³ /s)	V km ³
JAN	57.40	51.21	27.30	57.40	12.69	28.91	4.25	5.7375
FEB	78.20	69.77	26.90	78.20	16.98	20.14	2.96	5.7350
MAR	110.50	98.59	24.10	110.50	20.92	21.07	3.10	5.7323
APR	134.10	119.65	16.10	134.10	14.76	11.71	1.72	5.7295
MAY	186.70	166.58	10.20	186.70	9.62	8.23	1.21	5.7247
JUN	289.60	258.39	9.30	289.60	12.35	7.19	1.06	5.7157
JUL	349.30	311.65	7.40	349.30	8.31	4.11	0.60	5.7103
AUG	352.60	314.60	6.80	352.60	6.29	5.42	0.80	5.7101
SEP	291.80	260.35	7.10	291.80	6.07	6.76	0.99	5.7155
OCT	187.40	167.20	12.00	187.40	13.00	16.77	2.47	5.7253
NOV	112.20	100.11	15.80	112.40	12.01	25.21	3.71	5.7325
DEC	67.40	60.14	24.10	67.40	12.76	31.34	4.61	5.7369
ANNUAL	2217.30	1978.23	15.59	2217.20	145.77	186.86	2.29	5.7300

Table 17.2. Reconstructed lake volume during the MBA. (PA = Potential evaporation; PET = Potential evapotranspiration; MWC = Mean relative water content; AE = Actual evaporation; AET = Actual evapotranspiration; P_{add} = Average monthly additional precipitation; Q = Mean monthly discharge; V = Reservoir volume).

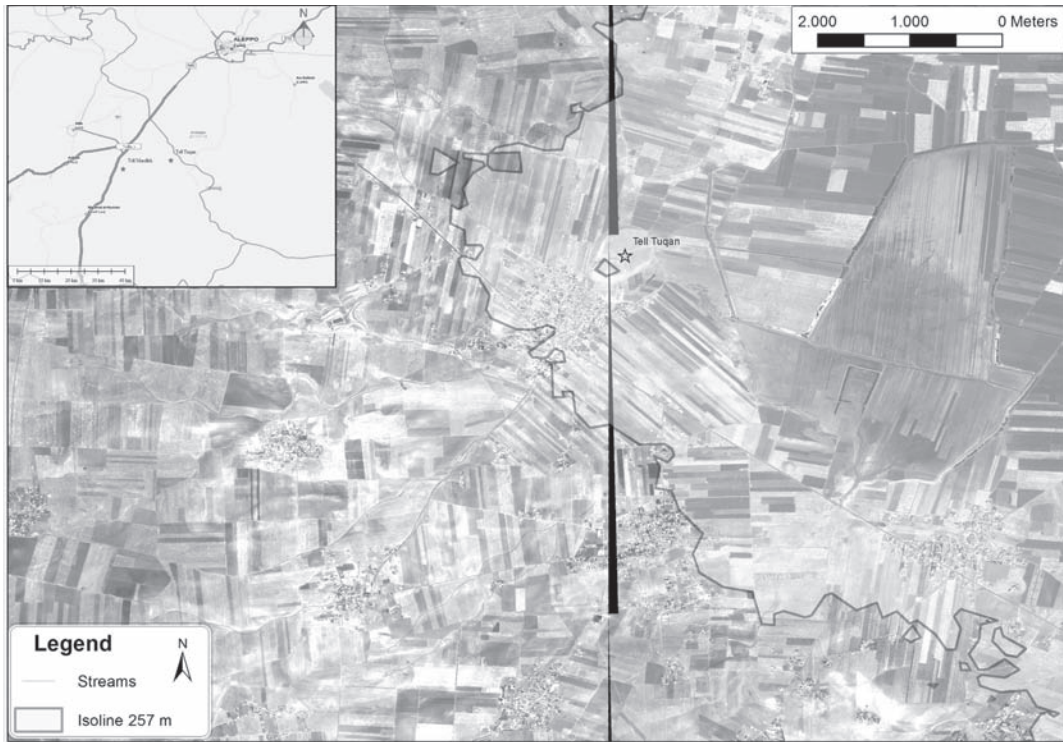


Figure 17.1. Ebla, Tell Tuqan, and the Matkh endorheic basin. Note the natural channels flowing eastward, which show prominent variations in the incision at around 275 m and 257 m a.s.l., respectively. Below the latter elevation, the channels do not show incision (in the background, CORONA imagery).



Figure 17.2. Google™ Earth Pro view of Tell Tuqan, showing the rectilinear southern slope, with the whitish strip of the wave abrasion bench at the same elevation of the dock.



Figure 17.3. Southeastern slope of Tell Tuqan, view from the plain. Finger is showing the wave abrasion bench at the same elevation of the dock.



Figure 17.4. Dissolution features typical of underwater bio-erosion. Close-up of the surface of a limestone block of the dock.

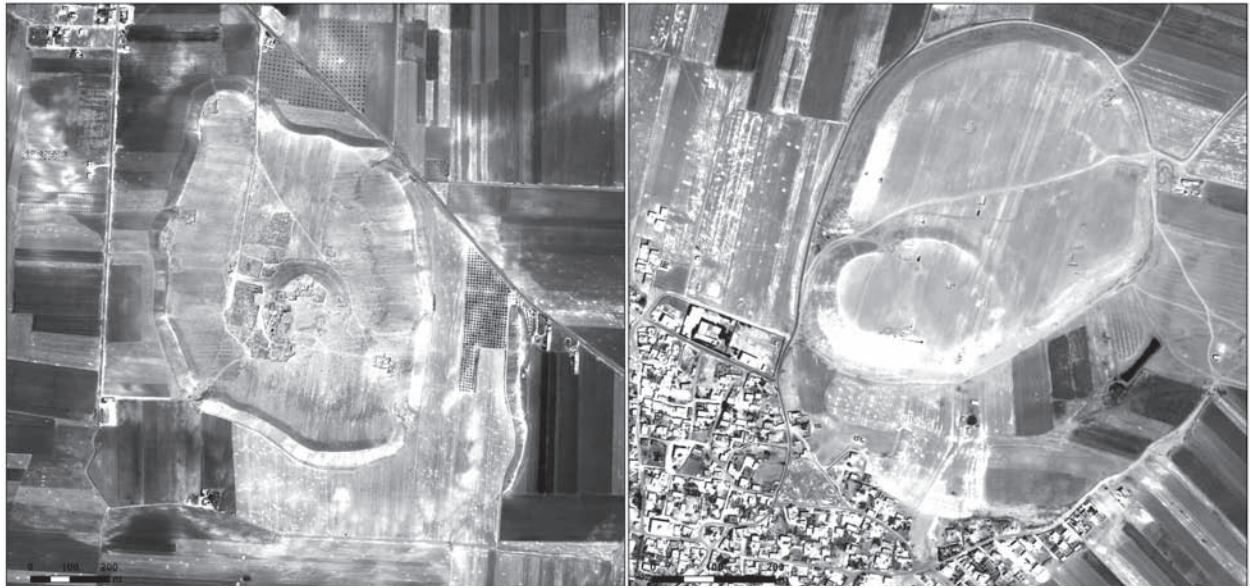


Figure 17.5. Right: Tell Tuqan and the dyke to its south-east, i.e. toward the storm direction. Left: Ebla and the embankment to its south-east (Google™ Earth Pro satellite imagery).

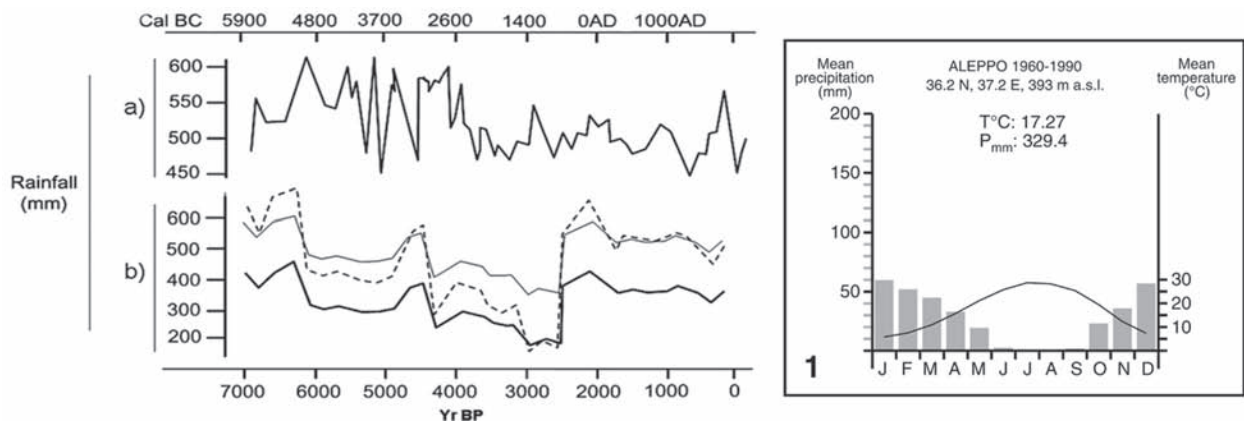


Figure 17.6. Left: Reconstruction of the precipitation pattern from isotopic data. a) Soreq cave; b) northern Syria paleocarpological data (adapted from Fiorentino et al. 2008). Right: Present day precipitation pattern at Aleppo (adapted from Kaniewski et al. 2011).

CHAPTER 18

A THIN BASIS

The Soil Landscape of Ebla and Tell Tuqan

A. Arnoldus-Huyzendveld

1. INTRODUCTION

Generally, soil sustains the growth and renewal of vegetation and, therefore, the production of food and fiber for the human community. Production capacity depends on its intrinsic characteristics, on climate, and on human actions. Through the interaction of inorganic and living elements, soils are as resilient to changes from the outside as organisms: in other words, soil features and functions are rather stable over time unless they degrade under a catastrophic or continuous outside pressure (natural or anthropic). Soil characteristics are not isolated from other environmental components, like geological substrate, geomorphology, drainage pattern, vegetation, and land use. The complex of these elements forms the evolving soil landscape system, which can be analyzed through an integrated framework that includes data from other disciplines.

This study focuses on the soil landscape of the areas surrounding Tell Mardikh and Tell Tuqan.¹ My fieldwork was guided by two main questions: first, is there a clear difference between the environmental conditions of the two tells, considering that the economy of Ebla was mainly based on cattle herding (besides commerce) and the economy of Tell Tuqan on cultivation? Second, do the local soil characteristics offer any indication of ongoing or past environmental degradation? In what follows I will present my answers to both questions, even though the second one is only a working hypothesis at the

moment (see also Cantelli, Martina and Picotti, in this volume).

2. GEOLOGICAL CONTEXT

The city of Ebla is located on a low hill at an altitude of just over 400 m a.s.l. within a rolling landscape, on the divide between two minor wadis running northward. Regarding the original morphology of the city of Ebla, before the artificial creation of the tell, one may presume the existence of a very low ridge oriented more or less from north to south. This is shown by the similar altitudes of the geological formations in the excavation area and in the area south of the walls (415 m a.s.l.).

More broadly, the area belongs to the Syrian upland, which forms a closed watershed surrounded by the Euphrates basin, the internal basin of Palmyra, and the Mediterranean coastal basins flowing out into the Orontes River. The western boundary of the watershed is formed by the Jebel ez-Zawiye mountain chain, and the eastern boundary by a slightly uplifted area along the axis Aleppo–Palmyra (Wirth 1971, 41–67; Petrospect 1971). The foot slopes of the Taurus in Turkey and the mountain chains extending between Damascus and Palmyra also enclose the area. This closed watershed originated in the Miocene² as a consequence of the uplift along the axis Aleppo–Palmyra, which gave rise to a number of vast lakes between the uplifted area and the coastal chains. Over time, drainage links

between the various basins were created, though not an outflow to the coast.

The available geological maps are on a scale of 1:1,000,000 (Technoexport 1964a), 1:500,000 (Technoexport 1964b), and 1:200,000 (Syrian Arab Republic 1963). According to the more detailed maps, the formations outcropping near Ebla and Tell Tuqan are of Tertiary and Quaternary origin, and of Secondary origin (Cretaceous) in the nearby mountains to the southwest. The oldest outcropping formations (see [Figure 18.1](#), code P) are Middle Eocene chalky and nummulitic limestone, directly overlying the marls and limestone of the Paleocene–Lower Eocene. The major outcropping formation of the area is composed of Middle Miocene (Helvetian) organogenic limestone (S). The lakes formed in the Upper Miocene (Tortonian) received continental deposits (marls, clays, sandstones, and conglomerates); they are located amongst others to the west of Idlib (8 km ca west of Ebla), and the geological maps show a small relict around Ebla ([Figure 18.1](#), code R). The great basaltic lava flows (B) were deposited during this period and later on. During the Pliocene, under the influence of the still rather humid climate, the drainage network was outlined, with the formation of a great number of watercourses. During the Quaternary, the alluvial—partly terraced—sediments were laid out (A), mainly within the limits of the former internal basins, which still today form low-lying and marshy zones.

Some field observations focused on the geological formations. Indeed, it became evident that the substrate on and near Tell Mardikh is different from the dominant surrounding substrate: it is a white soft calcareous stone, locally called “ràchu” ([Figure 18.1](#), codes R, r). The upper part (60–70 cm) tends to indurate, and it is directly overlain by a thin (2–3 cm) lamellar calcareous crust. The maximum thickness of the formation observed at Ebla was about 6 m, but overall it could well be in the order of tens of meters. Karst cavities were absent from the formation along the road to the west of Tell Mardikh. Near Idlib the stone is the same, but slightly marlier. Field observations

showed that the extension of this formation is somewhat larger than indicated on the detailed geological map, since at least in one site to the north of Tell Mardikh it is present with a thickness of a few meters over the underlying formation ([Figure 18.1](#), code r/s). The Middle Miocene formation (S), not outcropping at Tell Mardikh, is of a different nature. It is a hard calcareous stone with large fossil shells, which was observed amongst others near Saraqeb. According to the information collected locally, the same stone is present in a quarry south of Tell Mardikh. Modest karstic phenomena could be observed in this rock in the road cuts near Saraqeb. Together with basalt, these hard calcareous stones were used as building blocks for the walls of the city of Ebla. The soft calcareous formation of Tell Mardikh can be considered suitable for the creation of artificial underground cavities, not only because it is relatively easy to excavate, but also because the indurated superficial layer can sustain a cavity's roof. Considering also its low tendency to form karstic phenomena, it is highly probable that all cavities below the town of Ebla are artificial in origin.

De Maigret (1981, 16) states that in the area of Ebla the groundwater generally flows from west to east and from south to north. According to information collected in the field, in the area of Tell Mardikh the groundwater table (in the wells) stands at a depth of 150–200 m. Based upon these data, the surface of the groundwater table was reconstructed as sloping towards the north ([Figure 18.1](#)). It is possible that here the middle aquifer mentioned by De Maigret (*ibidem*) is intercepted, located in the permeable Eocene nummulitic limestone (P). Arguments for this interpretation are the gradual rising of the groundwater surface in correspondence with the rising of the Eocene formation to the east starting from Tell Mardikh, and the presence (well visible on aerial photographs in at least four points between Tell Tuqan and Sheikh Idris) of valley heads incised in correspondence to outcrops of the Eocene formation (P) below the Middle Miocene formation (S). Normally such a morphology would mean outflow of springs. But no water outflow was visible after the first rains

in the only spot that was observed in the field (Cheick Idris), so these forms could well be fossil (Pliocene or younger).

In the city of Ebla there is a well with a depth of 60 m. This is much shallower than indicated by the subsurface water data from the surroundings. A possible explanation is the presence of the upper aquifer mentioned by de Maigret (*ibidem*), located in the Middle Miocene marls (R?). In this context it is interesting to consider the difference between the areas of Tell Mardikh and Tell Tuqan. Near the former the groundwater depth is 150–200 m, whereas near the latter it is much shallower: 35–40 m to the north-north-east of the tell and 15 m in the surrounding plain. This is a remarkable difference, also in view of the agro–zootechnical potential of the two areas (see below). These subsurface waters were probably an important resource in antiquity (see *ibidem*, 25 for Ebla, and Mathys 2001, 128 for the Jezirah region).

3. SOIL CHARACTERISTIC

Many soil characteristics are related to climate, and therefore we shall address this aspect first. According to the Köppen classification, this area is a hot semiarid Mediterranean steppe (code BSh; Strahler 1975, 243). The average annual rainfall in Saraqeb, located 7 km to the north of Tell Mardikh, is 350 mm, reaching a peak during the months of December/January.³ The average temperature data from the nearest weather station, Aleppo, are: July/August, minimum 22.3°C, maximum 37.7°C; December/January, minimum – 2.6°C, maximum 11°C (Odenthal 1987, 330). The soil moisture regime is “xeric” (Ilaiwa 1983, 36) and the thermal regime is “thermic” (Soil Survey Staff 2010, 28). The “Length of Growing Period” (LGP), a parameter expressing the climatic potential for agriculture based on precipitation and temperature data, is about 150 days, with a dry period that goes on average from April, 10 to November, 12 (FAO 1982; data averaged between Aleppo and Hama). In practice, the start of the dry period should be even earlier, because of the (partially)

low Available Water Capacity (AWC) of the soils, estimated between 30 and 150 mm.

The Syrian soils are generally characterized by low humus content, high to excessive Ca and Mg carbonate content, and by montmorillonitic (swelling) clay minerals (Van Liere 1965, 9). Several soil maps are available for Syria, on different scales and with different soil classifications (Ilaiwa 2001, 227). It should be noted that inhomogeneity in the naming of soil types is generally related to the relatively late development of a worldwide soil classification, which started only with the realization of the Soil Map of the World (FAO/UNESCO 1974). This classification, at first only used as a map legend, has grown into a soil mapping tool that can be used on any scale with the creation, in 1998, of the World Reference Base for Soil Resources (WRBSR), further refined in a second edition in 2006 (FAO 2006). A sensible change for our purposes has been the elimination in 2006 of the Xerosols and their replacement with the Calcisols. Other worldwide applied classifications are the Soil Taxonomy (Soil Survey Staff 2010) and the classification used in the USSR (Bridges and Davidson 1982, 79).

The available soil maps of the area (ordered from a general to a more detailed scale) are: 1) FAO/UNESCO, 1974, Soil Map of the World, sheet VII-1, scale 1:5,000,000;⁴ 2) Ilaiwa M., 1985, Soil Map of Syria & Lebanon, sheet Aleppo, scale 1:1,000,000;⁵ 3) Cherkess R., 1954 (1964?), Soil Map of Syria, scale 1:500,000; 4) two soil maps at scale 1:200,000 of the zones around Aleppo and Hama (reported in Subramanian 1981).⁶ Contrasts between the several maps can largely be reduced to scale and classification differences. We report here the regional data according to the most detailed soil map presently available⁷ (1:500,000). Soils are classified according to the Russian system, for which the corresponding names according to FAO (2006) are indicated here in parentheses. The western part of our area is characterized by two alternating units: unit 16, soils on limestone plateaus, red grumusols (=Vertisols) and cinnamonic (=Calcisols) overlying calcareous crusts, undulating and

shallow; and unit 26, alluvials, outwash and other formations, with red grumusols (=Vertisols) and cinnamonic (=Calcisols), deep and level. In the eastern part there is almost exclusively unit 26. Further east there is unit 32, characterizing the Matkh depression, with brown groundwater soils. So basically we can see, moving from west to east, a transition from shallow cinnamonic soils on limestone and shallow red grumusols to deeper red grumusols and cinnamonic soils, up to the groundwater soils in the Matkh depression.

In 1988 two soil maps were compiled of the areas directly around Tell Mardikh and Tell Tuqan, on a 1:50,000 scale (see Plates 24:1–2). The classification, originally FAO/UNESCO (1974), has now been converted into FAO (2006). Calcisols and Vertisols are the dominant soil types. In Calcisols there is a substantial secondary accumulation of lime. They are common in highly calcareous parent materials and widespread in arid and semiarid environments. Vertisols are churning, heavy clay soils with a high proportion of swelling clays. These soils form deep, wide cracks from the surface downward when they dry out, which happens in most years. In the mapped areas, calcic horizons, more or less pronounced, are present in all shallow and moderately deep soils and in some deep ones. The soil complex corresponds perfectly to unit 41 as described by Ilaiwa (1983, 194): “Dominance of soils with a (lamellar) petrocalcic horizon on the plateaus and Vertisols in the lower parts”. The soil types encountered are listed in [Table 18.1](#).

In the Tell Mardikh area (Plate 24:2) the landscape is gently undulating, with slopes averaging 1–3 percent, and rarely exceeding 5 percent (Plate 25:1). The distinction between valleys and ridges is scarcely marked; therefore, it is not always possible to establish the direction of the surface drainage. The shallow depressions ([Figure 18.2](#)) are characterized by Vertisols with a calcic horizon at moderate depth (50–100 cm; unit V), locally at greater depth (W). Along the sides of the depressions and upon the ridges there are shallow (< 50 cm) Calcisols on hard (B) or chalky limestone (C), generally with a lamellar petrocalcic horizon. On the limestone plateaus there are Vertisols of moderate depth (U). Artificial soils (A), partly composed of decayed mud bricks and sherds, are found near the archaeological areas.

The landscape around Tell Tuqan (Plate 24:2) has a more pronounced morphology, with deeper incised valleys and slopes up to 8 percent. The tell is located at the edge of the Matkh depression, swampy in this region. The latter area has been reclaimed through three main canals that divide the winter floodwater of the wadi Quweiq (Van Liere 1965, 92). The general drainage direction of the mapped area is clearly towards this depression. The position of the various types of red soils within the landscape is the same as in the Tell Mardikh area, though chalky limestone is absent. In the Matkh depression we find deep gray-brown Vertisols (unit Y).

The soils around Tell Mardikh and Tell Tuqan form a pedogenetic continuum. They have several

A: artificial soils – Urbic Technosols (calcaric, clayic).
B: shallow red Calcisols on hard limestone - Leptic Petric Calcisols (clayic, chromic).
C: shallow red Calcisols on chalky limestone - Leptic Petric Calcisols (clayic, chromic).
U: moderately deep red Vertisols on the limestone plateaus - Endoleptic Calcic Vertisols (chromic).
V: moderately deep red Vertisols in the valleys - Calcic Vertisols (chromic).
W: deep red Vertisols in the valleys - Haplic Vertisols (calcaric, chromic).
Y: deep gray-brown Vertisols in the valleys - Haplic Vertisols (calcaric).

Table 18.1. Soil types of Ebla and Tell Tuqan, classification FAO 2006.

DEPTH CM	pH	SALINITY EC (1:1) MS/CM	CaCO ₃ %	ORGANIC CARBON %	CLAY %	LOAM %	SAND %
0 - 13	8.2	0.26	24.2	0.50	70.8	23.5	5.7
13 - 32	8.2	0.21	25.1	0.32	72.9	21.7	5.5
32 - 65	8.3	0.24	24.4	0.26	72.4	21.4	6.2
65 - 110	8.6	0.32	29.5	0.30	70.7	22.7	6.6
110 - 140	8.7	0.41	30.0	0.21	71.0	32.6	5.5

Table 18.2. Soil analyses of a deep red Vertisol near Taftanaz.

characteristics in common, among which the dominant red color (hence the terms also used of “chestnut” or “cinnamonic” soils), the overall clayey texture dominated by swelling clays, and the presence of a calcium carbonate concentration at variable depth and with variable degrees of development. Soils are calcareous throughout, with a pH of 7½–8; Munsell soil colors are 5YR 6/5 dry and 5YR 5/6 wet. Soil colors in the Matkh depression are less red (7.5YR 6/2 dry, 7.5YR 5/2.5 wet), a phenomenon undoubtedly due to the generally wetter (less oxidizing) conditions of the soil with respect to the plateau and its incisions. The artificial soils are less plastic and have a lighter color (5YR 7/4 dry, 5YR 5/5 wet).

In the Calcisols on the plateaus the carbonate concentration has taken the form of a 2–3 cm thick lamellar crust (petrocalcic) directly overlying the limestone substrate (Figures 18.3 and 4), which in case of a chalky substrate has an indurated upper part; in the Vertisols on the plateaus the carbonate tends to form a dense accumulation of more or less hardened nodules (Plate 25:2). In the Vertisols of the valleys the carbonate concentrations occur at greater depth and are less developed or even absent. In the dry season all soils of the area exhibit fissures caused by the swelling clays, but only in the Vertisols they reach a depth of more than 50 cm and a width of 3–4 cm; the cracks fill in gradually with surface material (Figure 18.5).

The following profile analysis draws on data available from ICARDA in Aleppo and related

to Taftanaz, 20 km north of Ebla (Table 18.2). It refers to a typical deep red Vertisol, thus comparable to the “W” type of the detailed maps. One may observe the clayey texture and the gradual increase towards the bottom of the percentage and pH of calcium carbonate; also worth noting are the low content in organic carbon and the complete absence of salinity.

A few words on the pedogenesis of these soils. Van Liere (ibidem, 139) considers the “reddish brown chestnut soils” to be seldom autochthonous, but, at least in the red upper part, to be made of sedimentary (colluvial) layers; the reddish colors would have been inherited from warmer Pleistocene periods. The formation of a calcic horizon or crust in calcareous sediments or rocks involves the weathering and rearrangement of the inherited carbonate (Birkeland 1999, 129). In these soils, when the crust or substrate form a barrier to percolation, the water starts flowing horizontally, forming a laminated top (Retallack 1990, 265) like the ones that were observed in the field.

4. SOIL QUALITIES AND LIMITATIONS

Our area is located in the so-called wheat belt of Syria. The cropping system usually applied is a three-year rotation, with cereals (wheat and barley), spring crops (chick peas and lentils), and fallow. Watermelons are sometimes grown in the fallow year. In some areas grapes and figs are grown. Cotton is the most frequent irrigated culture (Van Liere 1965, 12). Van Liere considers the current land use in the Aleppo-Idlib region

balanced, since the best soils are reserved for field crops and the poor soils for grapes, figs, olives, and pistachios. But to his opinion, too much wheat intended for dry farming has been planted on the reddish brown soils, and these should have been reserved for barley instead (*ibidem*, 100). A list of soil qualities and of the limitations of Syrian soils is given in Ilaiwa (2001, 231). Among the limitations are the presence of carbonate concentrations and crusts and the low organic matter content. The soils of the Upper Orontes plain, just south of Hama, mentioned in a special study by Van Liere (1965, 135), are probably similar to ours, and soil depth is indeed an important limiting factor in agricultural production.

Presently near Tell Mardikh there is rain-fed cultivation of wheat and irrigated farming of corn and cotton. Tree crops can be found, especially in the lower-lying zones: olives, figs, pomegranates, apricots, and almonds. Livestock is limited to sheep. In the plain of Tell Tuqan there is mainly irrigated agriculture. As for agricultural potential, the red soils of Tell Mardikh and Tell Tuqan are potentially moderately to highly productive soils for dry farming.⁹ The main limitations seem to be the climate, the low nutrient and organic matter content, and, in part, the lack of soil depth over the calcic or petrocalcic horizon. The gray-brown soils of the Matkh depression can be considered excellent for dry or irrigated farming (see Rossi Pisa, Ventura, and Vignudelli, in this volume).

As a comparison, in an area not dissimilar to ours, the second-class wheat land of the Jezirah, the production is on average 1,200 kg per year per hectare (Van Liere 1965, 34). Van Liere states that, contrary to general opinion, good management improves in particular the steppe soils, since the virgin steppe soil is hard to work and has poor structure, and often gives very low yields. In the course of a number of years, the structure improves by proper management and yields may increase. Soil improvement is difficult anyhow in the Mediterranean savanna, as Van Liere (*ibidem*, 32) notes: "Building up the humus content of the topsoil is a difficult task, and probably too expensive for steppe soils. The

summer is too long and too hot, soil temperature rises too high and its control is too difficult to prevent yearly excessive oxidation of organic matter. Leguminous crops, often recommended to improve the soil, have a doubtful value in the steppe. Agriculture in Syria is not poor in legumes, but they seem to contribute little to soil fertility". And moreover: "Afforestation is often proposed for certain parts of the Wheat Belt, but as this zone was originally Pistachio-to-quercetum savanna, growth is very slow and regeneration almost impossible. Thus afforestation on a commercial basis is not possible in this zone."

5. SOIL AND LAND DEGRADATION

Major land degradation processes in Syria are salinization in irrigated areas, water erosion in mountain regions, and wind erosion in the steppe area. Salinization of irrigated land only started in the 1940s, when large-scale irrigation became possible by using diesel pumps. It became critical from the 1950s on, when cotton was introduced as a summer cash crop, with a rise in groundwater level because of the absence of any drainage system and misuse of irrigation water. Water erosion mainly occurs in the mountains in the subhumid western part of the country. Wind erosion is presently affecting about a quarter of the arid steppe areas, and has intensified significantly in recent decades following the large increase in rain-fed agriculture (barley) from some 36,000 ha in 1982 to more than 550,000 ha in 1990 (Ibrahim 2002).

In 1991 the second edition of the World Map of the Status of Human-Induced Soil Degradation on a scale of 1:10,000,000 was published (Oldeman, Hakkeling, and Sombroek 1991). The whole belt from Hama to the Jezirah footslopes is marked with the red code Cn 2.5/Wt2.1 a. This indicates a very strong chemical degradation caused by agricultural activity, in the form of a moderate loss of nutrients/organic matter on 100 percent of the surface and a moderate loss of topsoil by water erosion on 0–5 percent of it. In this case "moderate" means that the terrain has greatly reduced agricultural productivity but is still suitable for use in local farming systems

(ibidem, 14). Supposing that water erosion in this map unit is limited to the steeper slopes near the mountains, degradation of our area would consist mainly in chemical degradation in the form of an overall moderate depletion of nutrients and organic matter.

Van Liere (1965, 29) mentions the absence of soil erosion in the Jezirah footslopes, an area quite similar to ours. This is confirmed by Edwards-Jones (2003, 10), who states that the plateaus and the plains are actually not suffering much from water erosion, as they are flat and the soils tend to have good structural stability even where rainfall is relatively high.¹⁰ Vaezi et al. (2011), working in Iran, noted that most soils located in the semiarid regions have a high structure stability and low erodibility due to their high carbonate content, and that therefore their erodibility is much lower than would result from the models generally used to estimate this factor. Indeed I did not observe traces of water erosion in the field nor on the aerial photographs, although it is known that this process can happen also on weak slopes, starting from 2 percent on (Soil Survey Division Staff 1962, 260). Cracking clays, so typical of our area, could well be quite resistant to the impact of the first rains, since the water filtrates into the fissures and the structural elements are initially brick-hard and impermeable. In fact, during a comparative experiment in Spain with various soil types, the subsurface cracking of the vertisol induced a high infiltration rate and a low soil loss in both dry and wet infiltration runs (Duiker, Flanagan, and Lal 2001). These data seem to contradict the strong regional soil erosion suggested by de Maigret (1981, 23).

6. CONCLUSIONS

To answer the first question raised in the introduction, there is indeed a marked difference between the surroundings of the two sites. The Tell Mardikh area has medium and good soils for dry farming and cattle herding, with no serious risks of degradation other than the loss of organic matter and possibly some erosion; by contrast, Tell Tuqan, apart from the soils mentioned, is located near a wide depression with good soils

for both dry and irrigated farming, though with a potential risk of salinization. The groundwater water level is also different in the two areas, being closer to the surface in the Tell Tuqan area.

The second question is more difficult to deal with. We can start from the known characteristics of a certain soil type and its recent history, and then go back in time. In my opinion there are two arguments sustaining the thesis that our soils have not degraded much over the past thousand years, the first being the absence of degradation under the recent pressure, and the second the presence of a well-developed, and therefore probably “old,” calcic horizon.

As stated before, the soils of the Mediterranean savanna belt have nowadays a good structural stability and a low erodibility. Their main degradation under recent agricultural use has consisted in a moderate depletion of nutrients and organic matter. The intrinsic characteristics and the proven resistance to modern degradation of the soils in the Tell Mardikh and Tell Tuqan areas indicate that probably these are still the same soils as a few thousands years ago, originally a bit richer in organic matter and nutrients and, due to a modest erosion, somewhat deeper on the plateaus and shallower in the valleys. Although I am not an expert on historical climate changes, I tend to think that those mutations might eventually have affected agricultural production, but not necessarily the above-mentioned characteristics.

Soils are normally conservative and resilient and their profiles register environmental changes cumulatively. Some features develop continuously with time, more or less quickly, and eventually reach a steady state. In most cases a precise chronological reference scale is lacking, but Retallack (1990, 263) indicates a time lapse for the calcic horizon in the order of 10,000 years and more, though this estimate doesn't seem to take into account climatic variability. Robbin and Stipp (1979) radiocarbon-dated various sections of a laminated carbonate crust in Florida, and found that laminae groups ranged uniformly in age from 5,680 years B.P. at the bottom to 400 years B.P. at the top, indicating that the

crust formed during the last 5,000 to 6,000 years. Several distinct stages of development of the calcic horizon have been recognized in the literature. According to the descriptions given in Birkeland (1999, 357), our Calcisols are in stage IV (a plugged calcic horizon with a weakly expressed laminar top), and the calcic horizons of the red Vertisols in stage III (many carbonate nodules). These features may indicate a persistence of the local soil characteristics, at least over the archaeological time scale of thousands of years. An open question is if this presumed soil stability is valid only for the time span following one of the attested deforestation phases (see Valsecchi 2007).

The hypothesis of a discrete stability of the soil landscape since historical times in the areas around the tells, as testified by the calcic horizons, can be a starting point for further comparisons with the other available data.

NOTES

- 1 This contribution is based on a study originally carried out in 1988 for the Sapienza University of Rome, at the invitation of Professor Paolo Matthiae. Bibliographic data were collected in Rome (FAO, Sapienza University) and in Syria (International Center for Agricultural Research in the Dry Areas, ICARDA, Aleppo). The original report was delivered in November 1988. The following text is an updated and revised version of that report within the ERC Ebla Chora Project.
- 2 The later Tertiary period is divided in Miocene, from 23 to 5.3 millions of years ago, and Pliocene, from 5.3 to 1.8 millions of years ago. The Quaternary period is divided in Pleistocene, from 1.8 million to 11,000 years ago, and Holocene, from 11,000 years ago to the present.
- 3 Data from ICARDA for the period 1960–1985.
- 4 This map is probably based upon the 1:500,000 soil maps by Cherkess. The dominant unit in our area is Lc 69-3a: fine textured Chromic Luvisols, level/undulating, with associated Calcic Luvisols and included Lithosols. Both Tell Mardikh and Tell Tuqan are on the limit of the unit Xk27-2a/b: Calcic Xerosols, medium texture, level/gently undulating to rolling/hilly, with associated Luvic Xerosols and included Calcaric Regosols and Lithosols.
- 5 The classification applied originally was the Soil Taxonomy, first edition (Ilaiwi 2001, 228). The dominant unit in our area is 41: Petrocalcic Xerochrepts, medium and fine/Calcixerollic Xerochrepts, level and sloping. Tell Mardikh is located on the limit of units 40 (Lithic Xerochrepts/Calcixerollic Xerochrepts/Lithic Xerorthents/Petrocalcic Xerochrepts, fine and sloping) and 34 (Calcixerollic Xerochrepts, fine/Vertic Xerochrepts, level to sloping, on basalts).
- 6 These maps are not available to me anymore. The map of the Hama area may refer to the work of Van Liere (1986, 135) in the Upper Orontes plain.
- 7 According to the indications of ISRIC (<http://library.wur.nl/WebQuery/isric/24696>), this map was reduced later to a scale of 1:100,000 prepared by Van Liere in 1953.
- 8 Unfortunately none of the analyzed profiles reported in the appendix of Ilaiwa (1983) refers directly to one of the local map units (40, 41).
- 9 On Map 5 in Wirth (1971, 116), our area is indeed indicated as favorable for agriculture from the viewpoint of soil quality and groundwater availability.
- 10 It would be useful to recover some measures of local soil erosion available at ICARDA (Aleppo), as mentioned in my original report.

Geological Map of the Larger Zone of Tell Mardikh and Tell Tuqan

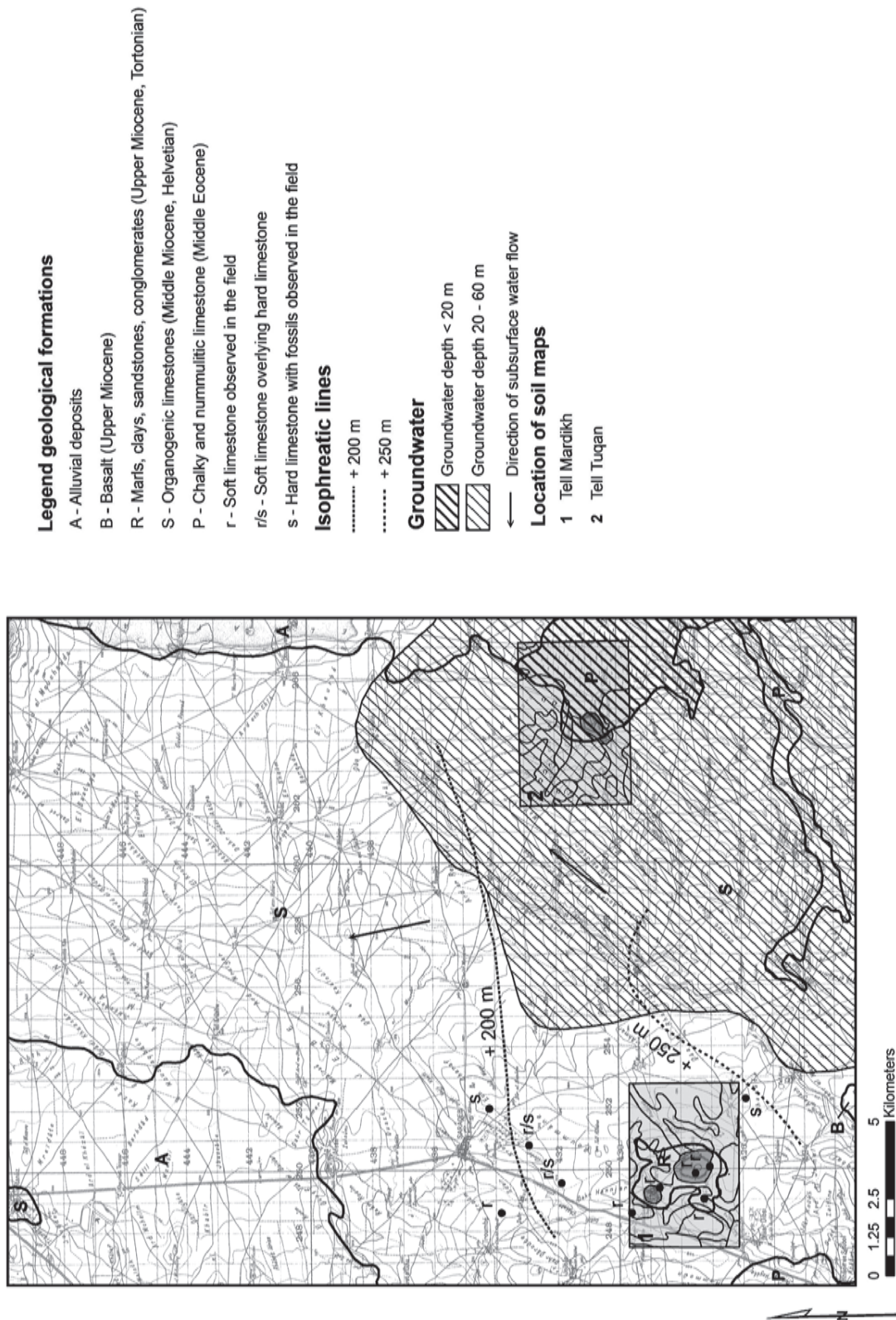


Figure 18.1. Geological map of the zone of Tell Mardikh and Tell Tuqan.



Figure 18.2. Typical landscape of the moderately deep red Vertisols of the valleys (unit V), north of Ebla.

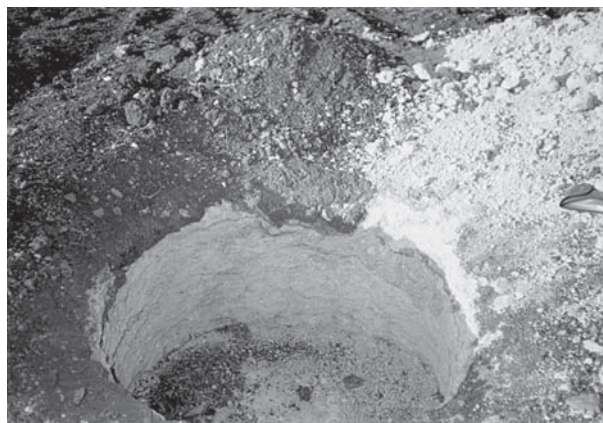


Figure 18.3. Soil profile visible in a hole for tree planting, west of Ebla: shallow Calcisol (25 cm) on soft Upper Miocene limestone (unit C); the wavy lamellar calcareous crust on top of the geological formation is visible.



Figure 18.4. Plowed shallow Calcisol on soft Upper Miocene limestone (unit C), north of Ebla; the rock fragments with the secondary calcareous crusts still attached are visible.



Figure 18.5. Partially filled in cracks on the surface of a moderately deep red Vertisol (unit V), valley east of Ebla.

CHAPTER 19

MODERN AGRICULTURE IN THE EBLA REGION

P. Rossi Pisa, F. Ventura, and M. Vignudelli

1. INTRODUCTION

The landscape, as a synthesis of environmental and human factors, is an important cultural element, especially in areas where human presence and activity have been a very relevant environmental factor across the ages. Landscape is strongly characterized by the kind of soil and vegetation coverage, which depends on how different species are aggregated in diverse communities.

From this point of view there are three different hierarchic levels: each one has a very important patrimony to valorize the territory. The first level is represented by the sum of different vegetal species, which constitutes the territorial flora. The second level is represented by the vegetal communities, which result from the different possible combinations of species that compose the flora; these systems are influenced by different combinations of environmental factors. The third level is represented by the landscape, which means vegetal communities in a reciprocal spatial and functional relationship.

This project aims at establishing effective protocols for the study, characterization, and conservation of large areas with relevant archaeological and environmental heritage. It is intended to develop a new approach for a hitherto unsolved problem, that is the characterization of large areas and not just single sites. Topographical, vegetational, and environmental data are integrated in a common

framework, in order to harmonize and increase the value of the archaeological and landscape cultural heritage.

From the numerous complete tablets found in the Ebla archives, only a few (Archi 1990a) concern the agricultural production in the region, with particular regard to cereals. Nevertheless, the role this region had in the development of agriculture since the first half of the 8000 B.C. is of primary importance, as testified by the onset of the domestication of cereals.

Monitoring the actual environment by surveying the natural vegetation, crops, climate, soil, and water in the Tell Mardikh region will help us reconstruct the flora of the past. Conjectures about agriculture in the Ebla period are mainly based on the finding of pollens and of the remains of other kinds of vegetation at the excavation site (Wachter-Sarkady, in this volume). Persistence and absence will be highlighted in the comparison of the two data sets, from the surveys and from the findings. This will allow the development of climate models, and the corresponding response of the floral, vegetational, hydrological, and climatic data will be analyzed to underline a functional correlation between the different aspects.

The crops surveys carried out around Ebla, in an area of about 2,000 km², are used in combination with the thematic maps available (such as pedological or soil maps) and with climatic and meteorological data in order to substantiate

the connections between the ancient and the modern time.

2. CLIMATOLOGY OF THE AREA

The climatological characterization of the area surrounding the archaeological site of Ebla for the modern time was delineated using two main sources of data: Internet and the ICARDA (International Centre for Agricultural Research in the Dry Areas). Multiannual elaboration from <http://www.climate-zone.com/climate/syria/celsius/aleppo.htm> are based on an eight-year database, while data from ICARDA were recorded starting from 1977 (Ryan et al. 1997). Both data set were used to draw Bagnouls and Gaussen graphs for four stations around Ebla, namely Aleppo, Breda, Tell Hadya, and Ghreife. This kind of climatological data elaboration allows to define a period of aridity for the stations using the scale $T=2P$, where T is the mean monthly temperature in degrees Celsius and P is the total monthly rainfall in millimeters (Bagnouls and Gaussen 1957). In the case of the stations used for this study, the aridity goes, on average, from the end of March to mid October. In these stations the mean yearly air temperature is 18.0, 17.0, 17.5, and 17.6°C respectively. When using the De Martonne Aridity Index $I = P/(T+10)$, where P = mean annual precipitation (mm/y) and T = mean annual temperature (°C), the area is classified as “semiarid” ($I = 11$), as it is in the classification of Koeppen used in a previous study based on data for the 1960–1985 period (De Martonne 1925; see Arnoldus-Huizendveld, in this volume; see also Koeppen’s Climate Classification 2006 at <http://clem.mscd.edu/~wagnerri/Climatology/classification.htm>). This shows the persistence of the climatic conditions in the present years.

Using monthly maximum and minimum temperature data, it was possible to calculate the average reference evapotranspiration by means of the Hargreaves estimation equation (Hargreaves and Samani 1982). The result was an evapotranspiration of about 1.500 mm/y, quite homogeneous among the stations. The graph in Figure 19.1 shows the Bagnouls and Gaussen

graph for the station of Tell Hadya. For this site, the aridity period ranges from the beginning of April to mid October. Agriculture is greatly influenced by aridity conditions, allowing to grow some kinds of crops (such as vegetables or fruit) only with the help of irrigation systems. More details on the management of water resources for agricultural purposes in the Syrian Arab Republic can be found in Kaisi and Yasser (2004).

For the area of interest, in the Idlib governorate, a rainfall dataset for the period from January 1, 2009 to October 31, 2010 was also available. These data were collected from the agrometeorological network of the Idlib governorate. The data were useful to understand in which kind of weather, as related to climatology, the surveys were carried out.

The map in Figure 19.2 shows the sites of the three ICARDA stations and ten stations from the governorate network that were chosen as representative of the region around Ebla. The data from these stations are summarized in Table 19.1. The precipitation amounts are of the same magnitude indicated by the climatological data, except for the station of Idlib. This can be explained with the position of this station, which is on a ridge. Moreover, looking at the graph, it is possible to recognize a decreasing gradient of precipitation moving from west to east. In conclusion, the yearly quantities (for the year 2009) are of the same magnitude as those revealed by the climatological data, ensuring us that the surveys were carried out in a quite “regular” year.

3. LANDSCAPE

The region around the village of Tell Mardikh is quite flat and suited for agriculture, with a chain of hills in the western part, parallel to the coast, and a territory that becomes more and more arid to the east. The knowledge of the soil characteristics of the area of interest is very important to understand the potential for agriculture and the land use. Soil maps at a national scale are available for example at the

European Soil Bureau (ESBN), and they include data from regions in the Mediterranean area. In particular, a soil map of Syria is available (http://eusoils.jrc.ec.europa.eu/esdb_archive/eudasm/asia/maps/SY3000_ISO.htm; see Panagos et al. 2011). From this source we can infer that going west to east, that is going from the hilly area toward the flatland, there is a Red Grumusol and Cinnamonic soil, in some parts overlying a Calcareous crust, that turns into a more basaltic area, with some badlands and shallow and stony Red Grumusol and Cinnamonic soil. More detailed analysis of the soil using the US Soil Taxonomy (Soil Conservation Service 1992) is available for the ICARDA stations (Ryan et al. 1997). In the Tell Hadya site the soil is classified as “very fine (clayey) montmorillonitic, thermic, Chromic Calcixeret”; it is well drained and dry, and the topography is mainly flat. The color is red/dark red, as typical of the area. In the ICARDA stations of Breda and Ghreife the soil is classified as “clayey, montmorillonitic, thermic, Calcixerollic Xerochrept”; it is well drained and dry, and the topography is flat. The color goes from reddish brown to yellowish red (these observations are presented in higher details in Arnoldus-Huyzendveld, in this volume).

It is remarkable that all the territory is covered by a layer of soil which has been tilled for centuries, if not millennia: for this reason the first layers are completely mixed and apparently poor of organic substance, and yet they are suitable for cultivation.

4. SURVEYS

The surveys were carried out in two different periods, in May and September 2010. The map in [Figure 19.3](#) shows the overall route taken in the two trips. The survey teams observed the land use around Ebla and recorded the crops. Moreover, the more common spontaneous weeds, typical of the area, were sampled, taken to the University, and identified. During the surveys pictures were also taken. [Table 19.2](#) summarizes the crops observed during the two surveys; the plant names in bold are for native species.

Data from the surveys were integrated and compared with data about agriculture coming from the Syrian Ministry of Agriculture and Agrarian Reform, which are available on the Internet (for the period from 2000 to 2008 see <http://moaar.gov.sy/main/>, in Arabic). In this site data are summarized by province (or governorate) and the attention was focused on the governorate of Idlib. [Table 19.3](#) summarizes the field crops present in the governorate, indicating the percentage of the area of interest with respect to the total cultivated land. Crops are listed in order of extension; names in bold represent native species. [Table 19.4](#) lists, according to the same criteria, fruit trees and vines.

The most common field crops, in both our surveys data and official data, are cereals and legumes, which are cultivated mainly in the plain (Plate 26:1). Horticultural crops are more common in small plots near the villages (Plate 26:2) and in the area around Tell Tuqan (see map in [Figure 19.3](#)), where a humid area allows irrigation. Where and when it is possible, wheat is irrigated too. Similar data were observed in the 1980s by Arnoldus-Huyzendveld. Studies by Fiorentino, Caracuta, Casiello, et al. (2012) show that grains were sometimes irrigated even in the Bronze Age. Fruit trees (olives, figs, pistachios) and vines are more common in proximity to the foothills, sometimes intercropped among themselves (for example, olive and vine: see Plate 26:3), or among field crops. As a general remark, agriculture seems to be very prosperous, both in irrigated and dry conditions.

In the Idlib governorate, 17 percent of the cultivated lands are irrigated, with great improvement of the yields. [Table 19.5](#) gives an example of the main crops in the area, with the percentage of land cultivated divided between irrigated/not irrigated and the relative yields. The improvements of cereal, legume, and olive yields with irrigation are impressive. Irrigation water comes mainly from wells, then from rivers and ditches; 65 percent of the irrigation is applied by sprinkler or drip systems, and the remaining 35 percent is applied with traditional gravitational

methods (data from the Ministry of Agriculture and Agrarian Reform).

Cereals and legumes are harvested with the thresher (Figure 19.4), while horticultural crops are often harvested by hand (Plate 26:4). Next to the fields it is common to see shepherds with their flocks of sheep, often browsing on crops residues. In the eastern part of the surveyed area, approaching Khanaser (see the map in Figure 19.3), the soil is very dry, and most of the fields are cropped with grazing species, as reported in Table 2. In this area *awassi* sheep browse directly in the fields.

5. CONCLUSIONS

The agro-climatological surveys carried out in 2010, supported by the official data of the Syrian Ministry of Agriculture and Agrarian Reform, may lead to the following remarks.

The climate is semiarid, with an average of 300 mm/y of rainfall and an evapotranspiration of 1,500 mm/y. The temperature ranges between 7°C in winter and 28°C in summer; the period of aridity, calculated by the Bagnouls and Gaussen index, is about 190 days. In these conditions the prevailing crops are rain-fed winter cereals, such as barley and wheat, *Triticum turgidum* L., *Triticum aestivum* L., and olive trees. These two crops occupy more or less the same percentage of cultivated land (about 32 percent). The

diversification of crops (species and cultivars) is rather high—forty-six crops according to the official governmental list and thirty-five found in the surveys—and the two-thirds are native crops. Legumes are present (*Cicer arietinum* L. and *Lens culinaris* Medic.) in the area of the governorate of Idlib as the third crop per cultivated area, followed by vegetables, spices, and vines.

The information collected in the agro-environmental surveys (Rossi Pisa et al. in press) about the presence of various crops, together with the climatic considerations, may be compared with the epigraphic data (see Marchesi, in this volume), with the archaeobotanical investigations pertaining to agriculture and vegetation in the territory of Ebla in the Early Bronze Age (see Wachter-Sarkady, in this volume), and with the results of the analysis of the remains with isotopes techniques (Fiorentino, Caracuta, Casiello, et al. 2012). We may note a substantial persistence of cereals (barley is still the main crop, as it was at the time of Ebla), olive trees, vines, vegetables, and spices. Moreover, the climatic conditions and the annual rainfall registered are consistent with what can be inferred for the EBA on the basis of the textual information on cultivars, wild plants, and trees. This also means that we may conveniently exploit our knowledge of the present environment and territory to complement the archaeological and epigraphic data of the period of the Royal Archives of Ebla.

P (mm)		ARIHA	EBLA	HAREM	IDLIB	KAFAR NOBOL	KAFAR TAKHARIM	SARAEQB	SINJAR	TAFNATAZ	TELL KHANZER
	LAT	35°48'	35°48'	36°12'	35°56'	35°36'	36°07'	35°52'	35°35'	35°59'	35°26'
	LONG	36°37'	36°47'	36°31'	36°37'	36°34'	36°31'	36°49'	37°00'	36°47'	36°58'
	ALT (m a.s.l)	590	424	150	430	640	477	367	406	326	370
1/1/2009-10/31/2010		789	454	947	1286	844	1045	490	368	541	278
1/1-12/31/2009		543	319	676	789	628	700	330	267	368	205
1/1-10/31/2010		246	134	271	497	216	346	160	101	174	73

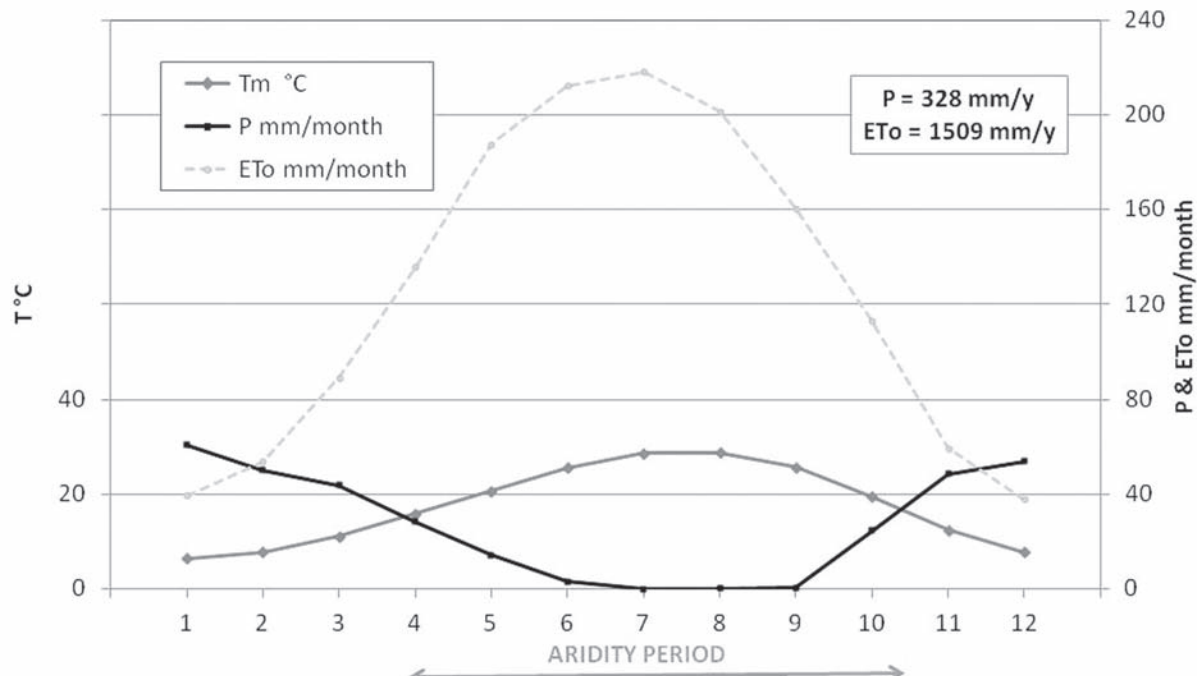


Table 19.1. Agro-meteorological stations of the Idlib governorate: position, altitude, and total amount of rainfall for selected periods. The graph shows data for the year 2009, with the stations distributed from west to east. Note the gradient in precipitation amount, approximately from 700 to 250 mm/year.

CROPS			
CEREALS	Durum wheat <i>Triticum turgidum L.</i>	SPICES	Black caraway <i>Nigella sativa L.</i>
	Soft wheat <i>Triticum aestivum L.</i>		Cumin <i>Cuminum cyminum L.</i>
	Einkorn <i>Triticum monococcum L.</i>		Coriander <i>Coriandrum sativum L.</i>
	Barley <i>Hordeum vulgare L.</i>		Aniseed <i>Pimpinella anisium L.</i>
	Sorghum <i>Sorghum vulgare L.</i>	TREES	Olive <i>Olea europaea L.</i>
	Maize <i>Zea mais L.</i>		Fig <i>Ficus carica L.</i>
LEGUMES	Chickpea <i>Cicer arietinum L.</i>		Grapevine <i>Vitis vinifera L.</i>
	Lentil <i>Lens culinaris Medic.</i>		Pomegranate <i>Punica granatum L.</i>
HORTICULTURAL CROPS (IRRIGATED)	Garlic <i>Allium sativum L.</i>		Walnut <i>Juglans regia L.</i>
	Onion <i>Allium cepa L.</i>		Pistachio <i>Pistacia Vera L.</i>
	Chili pepper <i>Capsicum annuum L.</i>		Almond <i>Prunus amygdalus Batsch.</i>
	Eggplant <i>Solanum melongena L.</i>	INDUSTRIAL CROPS	Cotton <i>Gossypium Hirsutum L.</i>
	Zucchini <i>Cucurbita pepo L.</i>		Sugarbeet <i>Beta vulgaris L.</i>
	Watermelon <i>Citrullus lanatus (Thunb.)</i>	GRAZING CROPS	Saltbush <i>Atriplex leucoclada Boiss.</i>
	Tomato <i>Solanum lycopersicum L.</i>		Shrubby saltbush <i>Atriplex halimus L.</i>
	Potato <i>Solanum tuberosum L.</i>		Mediterranean saltwort <i>Salsola vermiculata L.</i>
	Sunflower <i>Helianthus annuus L.</i>		Bluegreen saltbush <i>Atriplex nummularia Lindl.</i>
			Fourwing saltbush <i>Atriplex canescens (Pursh.) Nutt.</i>

Table 19.2. Crops observed during the surveys in the area shown on the map in [Figure 19.2](#) (native species are in bold).

CROPS	% TOTAL CULTIVATED AREA	CROPS	% TOTAL CULTIVATED AREA
Barley	17.34	Dry Onion	0.31
Wheat	14.13	Sunflower	0.30
<i>Soft Wheat</i>	8.72	Green Pea	0.29
<i>Durum Wheat</i>	5.41	Pumpkin	0.28
Lentil	5.14	Eggplant	0.24
Black Cumin	3.65	Squash	0.23
Chickpea	2.69	Broad Bean	0.23
Potato	2.41	Rambling Vetch	0.20
Cumin	2.21	Green Pepper	0.15
Autumn Potato	1.37	Haricot Bean	0.12
Cotton	1.35	Sorghum	0.11
Watermelon	1.04	Green Kidney	0.10
Spring Potato	1.04	Lettuce	0.09
Broad Bean	1.01	Musk Melon	0.09
Tobacco	0.88	Dry Pea	0.07
Sugarbeet	0.67	Cabbage	0.03
Cucumber And Snake	0.59	Cauliflower	0.03
Other Vegetables Winter	0.57	Dry Haricot	0.02
Tomato	0.39	Aniseed	0.02
Spring Tomato	0.38	Leaf Beet	0.02
Okra	0.36	Other Crops	0.01
Winter Sugarbeet	0.35	Sesame	0.01
Green Onion	0.33	Autumn Tomato	0.01
Autumn Sugarbeet	0.32	Peanut	0.001

Table 19.3. Field crops cultivated in the Idlib governorate, as listed on the Syrian Ministry of Agriculture and Agrarian Reform website (native species are in bold).

TREES	% TOTAL CULTIVATED AREA
Olive	32.75
Pistachio	1.91
Cherry	1.51
Fig	0.99
Apple	0.46
Grapevine	0.35
Pomegranate	0.20
Plum	0.18
Apricot	0.15
Green Plum	0.11
Almond	0.10
Citrus	0.04
Nut	0.03
Peach	0.02
Loquat	0.01
Quince	0.003
Pear	0.002

Table 19.4. Cultivated trees and vines in the Idlib governorate, as listed on the Syrian Ministry of Agriculture and Agrarian Reform website (native species are in bold).

CROP	IDLIB GOVERNORATE (% LAND COVER)		CROP YIELD (METRIC TONS/HECTARE)	
	IRRIGATED	NOT IRRIGATED	IRRIGATED	NOT IRRIGATED
Barley	0	17.34	-	0.72
Wheat	4.24	9.89	3.42	0.69
Lentil	0	5.14	-	0.17
Chickpea	0.35	2.34	1.97	0.69
Olive	1.48	31.27	2.55	1.09

Table 19.5. Main crops in the Idlib governorate, as listed on the Syrian Ministry of Agriculture and Agrarian Reform website.

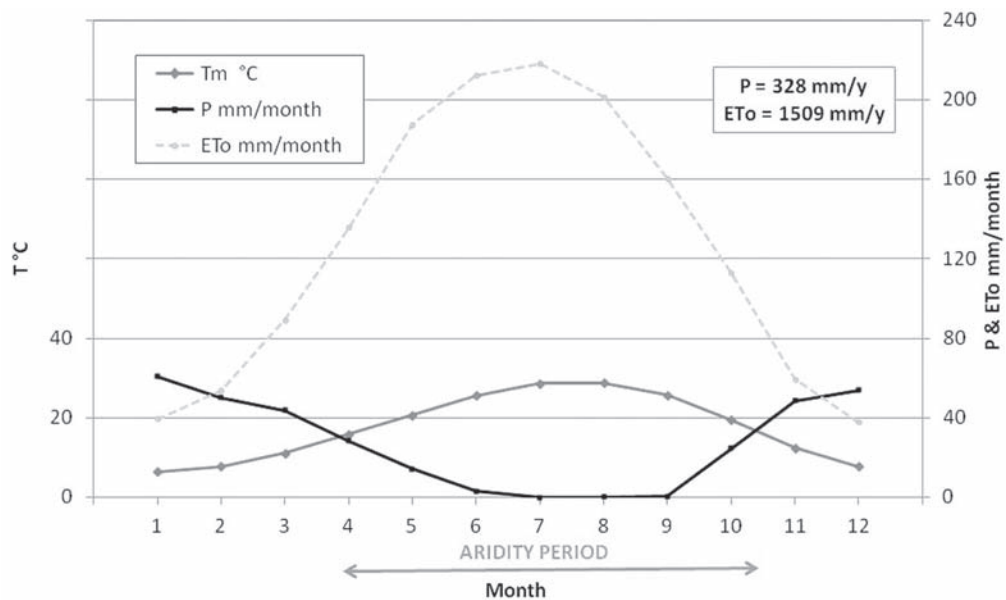


Figure 19.1. Bagnouls and Gaussen graph of the ICARDA station of Tell Hadya.

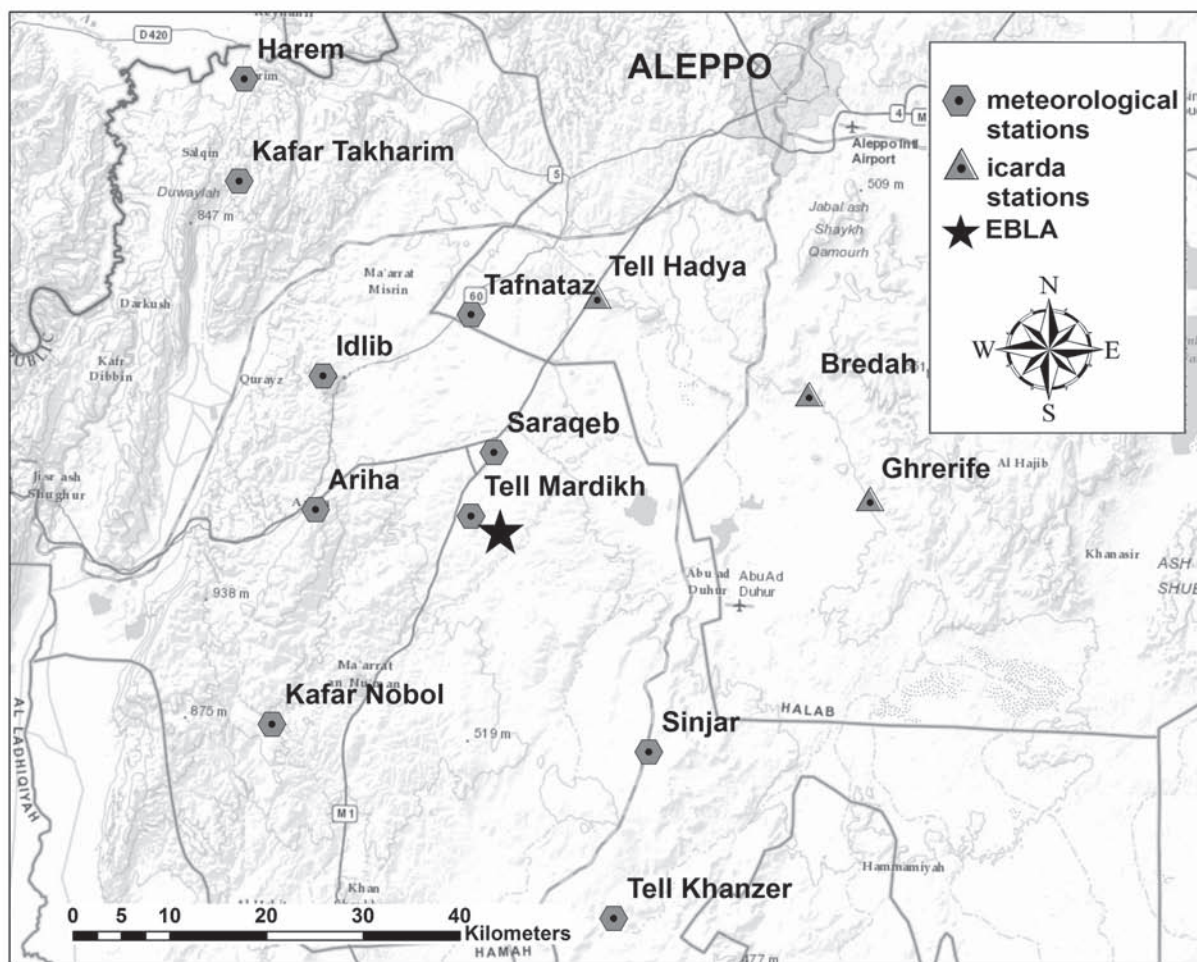


Figure 19.2. Map of the stations used for the climatic characterization of the area around Ebla.

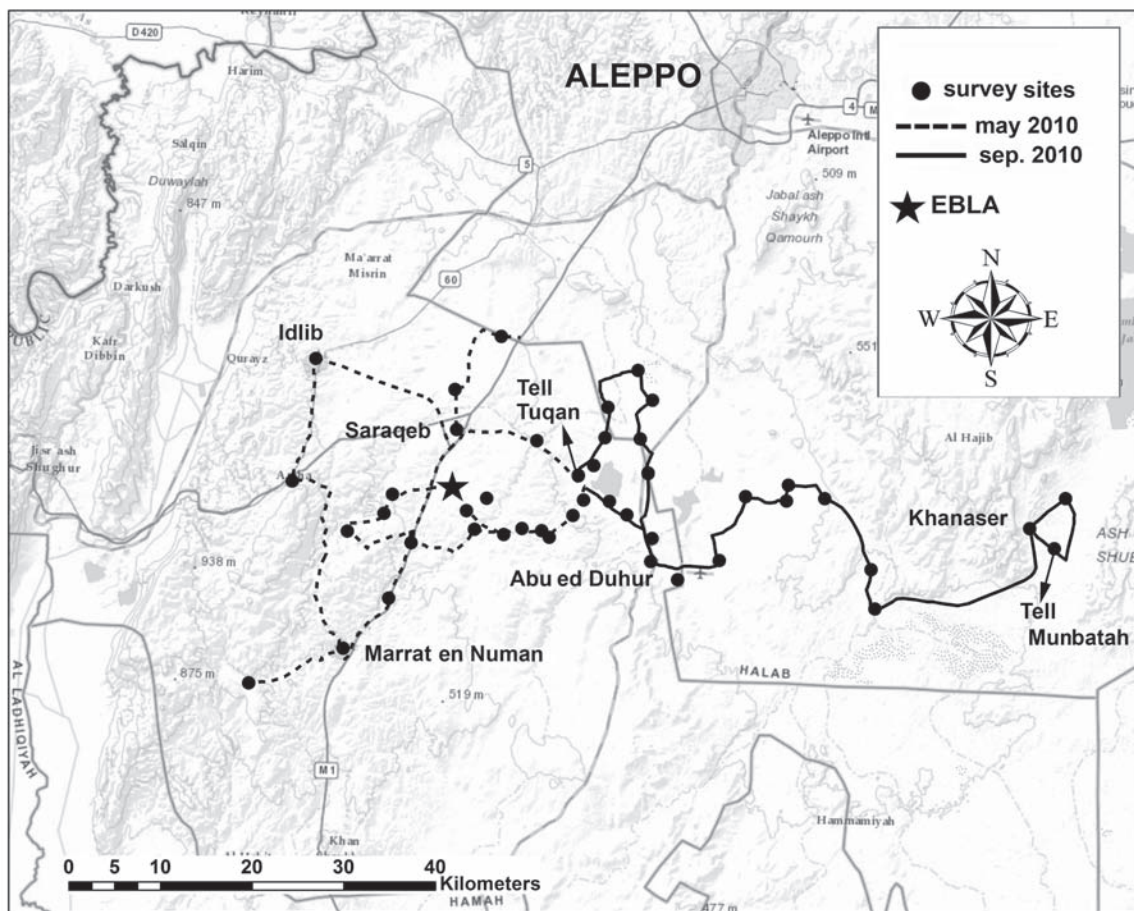


Figure 19.3. Map of the surveys carried out in May (dashed) and September (solid) 2010 around Ebla.



Figure 19.4. Cereal harvesting with a thresher near Tell Mardikh.

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PART 5

Archaeometry and Bioarchaeology

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CHAPTER 20

ARCHAEOMETRICAL ANALYSIS OF METAL OBJECTS FROM ROYAL PALACE G

A.C. Felici and M. Vendittelli

1. AIM OF THE RESEARCH¹

The study of metal objects from Royal Palace G presented in this contribution is part of a wide multidisciplinary project of archaeometric analyses, concerning several typologies of materials dating from the Early Bronze Age IVA (2400–2300 B.C.). Ten golden objects and one bronze dagger have been analyzed on site in a totally non-destructive way in order to determine their alloy composition, metalworking technique, and operational processes, which can be usefully compared with information contained in the cuneiform texts found in the archives of Royal Palace G.

2. EXPERIMENTAL METHOD

The findings were analyzed using energy dispersive X-ray fluorescence spectroscopy. This technique is very useful to carry out the analysis of the chemical elements constituting an object. In particular, the portable energy dispersive X-ray fluorescence spectrometers offer the opportunity to examine the object in a totally non-destructive way, without any sampling, and in the very place where it is kept.

Different points on the external surface of all samples were irradiated by the portable X-ray fluorescence spectrometer, covering an area of about 1 mm² for each selected point. The spectrometer is composed by an E.I.S. palladium anode X-ray generator powered with a voltage of 40 kV and a current of 0,4 mA, and a Peltier

cooled Si-PIN Amptek XR-100CR detector, with a surface of 5 mm² and a thickness of 500 μ m. The pulses generated in the detector are amplified and shaped by the Amptek PX2CR amplifier and analyzed by the Amptek 8000A multichannel analyzer connected to a portable personal computer. Using a shaping time of 20 μ s, the resolution of 170 eV FWHM (full-width half-maximum) of the manganese K $_{\alpha}$ line at 5.9 keV is achieved. Each spectrum was collected over a period of 200 s. Owing to the air existing between the sample and the detector, this X-ray fluorescence spectrometer can detect the K lines from chlorine (Z=17) to antimony (Z=51) and the L lines of all the elements heavier than silver (Z=47). The spectra were analyzed using the WINAXIL software (Van Espen 2002, 239–339) to obtain the concentrations of majority and minority elements (few percents in weight) and trace elements (part per million) by means of the fundamental parameter quantitative procedure (de Vries and Vrebos 2002, 341–405). To perform this operation, the spectra of several bulk pure elements used as standards were measured (Ag, Cd, Cu, Fe, Mn, Mo, Pb, Sn, Ta, Ti).

The instrumental limit of detection was determined for the K $_{\alpha}$ and L $_{\alpha}$ lines of elements found in the investigated samples (Terenzi et al. 2010, 1406), and the values are reported in [Table 20.1](#). Due to the set-up configuration, the detection limit is poorer for the lowest atomic number elements, for which the air absorption of the X-rays fluorescence reduces the instrumental sensitivity.

3. RESULTS

3.1. Golden Objects

Ten gold objects (Figure 20.1 and Plate 5:2) have been analyzed in order to obtain the alloy composition. All the objects were found in the 2003 excavation season in room L.2982 of Royal Palace G, within the Administrative Unit (Matthiae 2004, 310–11).

Figure 20.2 shows an X-ray fluorescence spectrum measured on one of the golden findings. The results of the analyses showed that all the objects are composed of a nearly binary alloy whose main components are gold and silver. In addition to these two elements a minor amount of copper was found. Several other elements such as platinum, iridium, iron, and lead are present as traces, as reported in Table 20.2. In all the analyzed areas the presence of calcium is revealed, in a concentration that varies from point to point and ranges from 0.4 to 6 percent of the total weight. This element does not belong to the alloy but is related to the contamination of the surface occurred during the burying.

Due to the presence of calcium in the volume sampled by the X-rays, the measured amount of gold, silver, and copper is lower than the real amount in the alloy. For a better comparison between the various objects, and in order to obtain a composition of the alloy as close as possible to the real one, the concentration of these three elements was normalized to 100 percent, and the values obtained are reported in Table 20.3. Since each object was analyzed in different areas, for every chemical element the mean value of its normalized weight fraction and the maximum dispersion were calculated. The values obtained, measured in percent of the total weight, are reported for each object in the following sections together with a brief description of the findings.

TM.03.G.600

The finding (Figure 20.1, a) is part of an anthropomorphic statuette, a forearm up to the

elbow with the hand grasping an insignia. The object is 5 cm long and has a diameter of 1.3 cm. It has been handworked by rolling up a gold leaf on itself. The main composition of the alloy is:

GOLD: 76 ± 2	SILVER: 23.4 ± 1.9	COPPER: 0.57 ± 0.18
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TM.03.G.767

The object (Figure 20.1, b) is part of an anthropomorphic statuette, an almost complete right arm folded at the elbow with the fist clenched around something that could be a scepter. The finding is 5.5 cm long and 5 cm wide and has a diameter of 1.5 cm. As in the case of TM.03.G.600, the object has been realized by handwork, rolling up a gold leaf on itself. The leaf was nailed, as suggested by the presence of some holes on the back of the object. The main composition of the alloy is:

GOLD: 88 ± 1	SILVER: 11.3 ± 0.9	COPPER: 0.57 ± 0.14
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TM.03.G.771a, c, d, and i

Handworked gold leaves belonging to a group of twenty-six laminae.

TM.03.G.771/a: Irregularly shaped lamina with two small holes (Figure 20.1, c); 7.2 cm long and 3.6 cm wide. The main composition of the alloy is:

GOLD: 68.8 ± 1.6	SILVER: 29.5 ± 1.4	COPPER: 1.71 ± 0.32
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TM.03.G.771/c: Lamina showing corrugated grooves parallel to each other and one small hole (Figure 20.1, d); 3.2 cm long and 1 cm wide. The main composition of the alloy is:

GOLD: 77.4 ± 0.3	SILVER: 21.4 ± 0.3	COPPER: 1.24 ± 0.05
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TM.03.G.771/d: Small lamina 2 cm long and 1.4 cm wide (Figure 20.1, e). The main composition of the alloy is:

GOLD: 88.5 ± 2.1	SILVER: 11.2 ± 2.0	COPPER: 0.31 ± 0.10
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TM.03.G.771/i: Rectangular lamina showing a fretwork manufacturing with five rhombus-

shaped holes (Figure 20.1, f); 2.8 cm long and 1 cm wide. The main composition of the alloy is:

GOLD: 73.3 ± 1.7	SILVER: 26.0 ± 1.6	COPPER: 0.70 ± 0.09
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TM.03.G.785

The finding (Figure 20.1, g) is probably part of the forearm belonging to an anthropomorphic statuette. It is 3.6 cm long and has a mean diameter of about 1 cm. It has been realized by handwork rolling up a gold leaf on itself. Together with the object, residues of burnt wood and four small golden nails were found. The main composition of the alloy is:

GOLD: 85.7 ± 0.1	SILVER: 13.4 ± 0.1	COPPER: 0.88 ± 0.02
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TM.03.G.795

Golden disc with a diameter of 3.5 cm. It is completely decorated with a rosette whose twelve petals are trimmed by a drop-like ornament (Figure 20.1, h). The main composition of the alloy is:

GOLD: 82.0 ± 1.2	SILVER: 17.0 ± 1.1	COPPER: 0.99 ± 0.46
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TM.03.G.797

Small handworked lamina 4.8 cm long and 2.6 cm wide (Figure 20.1, i). The main composition of the alloy is:

GOLD: 76.8 ± 0.5	SILVER: 22.7 ± 0.4	COPPER: 0.50 ± 0.05
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TM.03.G.868

Small handworked lamina 2.7 cm long and 2.8 cm wide (Figure 20.1, l). The main composition of the alloy is:

GOLD: 74.7 ± 0.1	SILVER: 24.0 ± 0.1	COPPER: 1.31 ± 0.02
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3.2. Bronze Objects

During the in situ analyses several bronze objects were analyzed. One of them is described below.

TM.83.G.378

Finding dates back to the EBA. It consists in a dagger with a central double ribbing. Three of the nails used to fix the handle are still present on the junction. The surface of the finding is almost completely covered by a corrosion crust. Figure 20.3 shows the X-ray fluorescence spectrum relative to one of the areas of the object; the characteristic lines of copper and tin are clearly visible. The weight fractions of the elements present in the analyzed areas are reported in Table 20.4. Besides copper and tin, traces of zinc and iron have been detected. The analyzed areas also show the presence of calcium and chlorine in a concentration of several percents of the total weight. As in the case of golden objects, the presence of calcium is related to the contamination of the surface during the burying, while chlorine is one of the constituents of the corrosion products of copper.

4. DISCUSSION

4.1. Golden Objects

As already noted in the previous section, the results of the energy dispersive X-ray fluorescence analyses showed that all the objects are composed of a nearly binary alloy whose main components are gold and silver. Figure 20.4 shows the histogram of the weight fractions of these two elements within the ten analyzed findings. From the data reported in Figure 20.4 it is possible to observe that, for the majority of the objects, the silver mass fraction is above 20 percent of the total weight and, for one in particular (TM.03.G.771a), it reaches the value of 30 percent. It is worth to notice that the silver concentration of this last object exactly matches one of the five price categories in which, according to the cuneiform texts, pure gold was classified (Waetzoldt 1985, 14). In two of the arms (TM.03.G.767, TM.03.G.785), in one of the small laminas (TM.03.G.771d), and in the golden disc (TM.03.G.795) the silver weight fraction is lower than in the other findings and it is comprised between 10 and 17 percent. The alloy composition of these last findings is comparable to that of the four laminas (TM.89.G.267 a–d) found on the floor of room L.2890 of Royal Palace G, and analyzed by Palmieri and

Hauptmann by scanning electron microscopy coupled with energy dispersive spectroscopy (Palmieri and Hauptmann 2000, 1259–82). It should be noted that a silver mass fraction of 17 percent of the total weight, measured in the alloy of the golden disc (TM.03.G.795), corresponds to a ratio of gold to silver of 5 to 1, namely the ratio of gold considered of better quality in Ebla, as mentioned in cuneiform tablets (Archi 1993c, 51). Thus, the golden disc seems to be an object of particular value that was treated with great care, not only in the manufacture of the decoration but also in the choice of material. In the case of the two arms, too, the high purity of the golden alloy could be a sign of the importance of the artifacts to which they belonged.

Despite these considerations, it is not possible to establish if the presence of silver in the analyzed objects results from a deliberate alloying or if natural gold was used.

In fact, silver can be present in natural gold with concentrations of the same order of the ones found in the analyzed objects (Ortega-Feliu et al. 2007, 333; Tylecote 1992, 4–5).

Comparing the alloy composition of the four fragments of laminas cataloged under the same inventory number (TM.03.G.771) it is possible to state that they do not belong to the same object; in fact, the values of gold and silver mass fractions show greater differences from one fragment to the other than the maximum dispersion associated to the measurements performed on each single object.

In general, it was not possible to find a correlation between the alloy composition and the processing technique used; as an example, the three arms, which were all realized by rolling up the gold leaf on itself, show different ratios between gold and silver mass fractions.

Besides gold and silver, a small amount of copper is present in the alloy; Figure 20.5 shows the histogram of the weight fraction of this element for the ten objects. Copper is present in all findings, and in the majority of them its mass fraction is less than 1 percent of the total weight,

the level usually found in natural gold (Tylecote 1992, 4–5). The same low content of copper was found by Palmieri and Hauptmann in three of the laminas they analyzed (E62, E63, E64) (Palmieri and Hauptmann 2000, 1259–82). In three of the objects (TM.03.G.771/a, TM.03.G.771/c, TM.03.G.868), as well as in one of the laminas analyzed by Palmieri and Hauptmann (E61) (*ibidem*), the copper concentration exceeds the value of 1 percent, even if it remains below the value of 2 percent. Nevertheless, in this case also an intentional addition of copper to the alloy can be excluded, since the mass fraction of this element is too low to produce relevant changes in the physical properties of the alloy, such as fusion temperature or color (McDonald and Sistare 1978, 66–69), or in its mechanical properties (Pingel 1995, 394–96). The association of this level of copper to a remelting of gold contaminated by copper containing solders, as suggested by Palmieri and Hauptmann (2000, 1266), cannot be excluded, even though cases of natural gold exceeding the level of 1 percent of copper are attested in the literature (Chapman et al. 2006, 910).

The data reported in Table 20.3 show some differences in the variability of the mass fraction of gold and silver found in each single object, as indicated also by the values of the maximum dispersions reported in the previous section. In order to better highlight these differences in the homogeneity of the alloy, the degree of elemental variability was estimated for each object by first calculating the arithmetic mean of the relative percent differences between the measured weight fractions of gold and silver and their respective mean values, and then averaging these two values to obtain the mean total elemental variability $\bar{d}$ (Terenzi et al. 2010, 1406–7).

The values of $\bar{d}$ for the ten objects are shown in Figure 20.6. For the findings TM.03.G.771/c, TM.03.G.785, TM.03.G.797, and TM.03.G.868 these values are of the order of 1 percent or less, and thus it is possible to conclude that the alloy constituting each object is very homogeneous. For artifacts TM.03.G.600, TM.03.G.767, TM.03.G.771/a, TM.03.G.771/i, and

TM.03.G.795 $\bar{d}$ ranges from three to five percent and this is indicative of a less homogeneous alloy. In the case of the finding TM.03.G.771/d the mean total variability $\bar{d}$ reaches the value of 10 percent and the homogeneity of the alloy has to be considered poor. These differences in the homogeneity of the alloy could be ascribed to differences in the alloying processes and in particular to different cooling rates that can cause various degrees of segregation of the chemical elements.

Concerning the chemical elements present in traces, the most significant are platinum and iridium. The occurrence in gold objects from the Near East of metallic inclusions containing these two chemical elements, or in general of elements of the platinum–iridium group, is attested in the literature (Young 1972, 5–13; Whitmore and Young 1973, 88–95; Meeks and Tite 1980, 267–75). Since the association of these elements to gold is very rare in primary deposits, the presence of these inclusions in ancient artifacts could indicate that the gold used came from placer deposits in which grains of gold and of platinum–iridium group elements were associated during the fluvial transport. Although some authors have suggested the possibility to establish the provenance of gold based on the relative ratio of the platinum–iridium group elements (Young 1972, 5–13; Whitmore and Young 1973, 88–95), this possibility has been excluded by others (Meeks and Tite 1980, 267–75). In the case of the results presented in this work, due to the nonoptimal conditions in which the measurements were carried out—and, in particular, to the high instability of the power supply, that affected the line shape of the peaks and the background—a reliable quantitative evaluation of the mass fraction of elements in traces is not possible, and thus any attempt to identify the provenance of gold should be discarded.

Besides platinum and iridium, traces of lead and iron are present in all objects. The former is an element often associated to silver, while the presence of the latter can be due to the association of gold and magnetite (iron oxides)

in placer deposits. Nevertheless, the surface of the objects is not completely clean, as suggested by the presence of calcium, and it is not possible to exclude the possibility that iron might be associated with the traces of soil still present on the object.

4.2. Bronze Objects

The analyses performed on the dagger (TM.83.G.378) show that the object is constituted by an alloy of copper and tin. However, the tin content presents a high variability from point to point, and on average it results considerably lower than the one found by Palmieri and Hauptmann for coeval artifacts (TM.79.G.143, TM.78.G.344, TM.79.G.144) analyzed by using inductively coupled plasma spectroscopy (Palmieri and Hauptmann 2000, 1259–82). For these objects the tin amount almost corresponds to the “ideal” bronze composition, as mentioned in the cuneiforms tablets (Archi 1993a, 615), with nine parts of copper and one of tin, while for the dagger the ratio between copper and tin is about one order of magnitude lower. A fourth object analyzed by Palmieri and Hauptmann (TM.78.G.283) showed, instead, an intermediate tin content, with thirty parts of copper and one of tin.

The huge difference between the tin mass fraction measured on the dagger and the ones measured on the other objects can be partially ascribed to the methods of analysis that were used. In fact, Palmieri and Hauptmann performed an inductively coupled plasma spectroscopy analysis on metal extracted by micro-drilling the inner part of the objects, while the energy dispersive X-ray fluorescence analyses of the dagger were performed directly on its corroded surface. Since the penetration length of X-rays is few tens of micrometers, the energy dispersive X-ray fluorescence analysis provides the elemental composition of the corrosion products rather than of the alloy. In any case, even though a loss of tin may occur in the interaction between the corroded surface and the soil, the possibility that the real composition of the dagger is that of an “ideal” bronze can be excluded.

Except for one object (TM.79.G.143), the analyses performed by Palmieri and Hauptmann show the presence of arsenic, with concentrations ranging from 0.5 to 1 percent of the total weight. The authors ascribed the presence of this element to the remelting of copper with an arsenic content rather than to an intentional alloying. On the contrary, the dagger seems not to contain arsenic, unlike other objects from Tell Mardikh analyzed during the same campaign, for which this element was clearly detected also on very corroded surfaces.

NOTES

- 1 We are very grateful to Prof. Paolo Matthiae and Prof. Luca Peyronel who involved us in the project and gave us the opportunity to analyze the findings. We would like to thank Dr. Salvatore Tricoli for his support during the onsite campaign in Syria and Dr. Agnese Vacca for her helpful information on the archeological aspects of the research. A special thank to Prof. Mario Piacentini for his continuous and strong support and for the stimulating discussions.

Ca	Fe	Cu	Ag	Ir	Pt	Au	Pb
0.2	0.03	0.04	0.04	0.1	0.1	0.1	0.1

a

Cl	Ca	Fe	Cu	Zn	Sn
1	0.2	0.03	0.05	0.04	0.8

b

Table 20.1. Instrumental limit of detection for the elements found in the golden objects (a) and bronze objects (b). The values are given in percent of the total weight (wt. %).

	Ca	Fe	Cu	Ag	Ir	Pt	Au	Pb
a)	2.9±0.2	0.34±0.03	0.40±0.04	21.2±0.2	0.4±0.1	0.8±0.1	74±1	0.4±0.1
b)	0.5±0.2	0.39±0.03	0.41±0.04	10.7±0.1	0.5±0.1	0.2±0.1	87±1	bdl

Table 20.2. Elemental composition of golden objects obtained by Energy Dispersive X-ray Fluorescence analysis. The values are given in percent of the total weight (wt. %) (bdl = below the detection limit).

	Au	Ag	Cu
TM.03.G.600	77 ± 1	22.2 ± 0.2	0.48 ± 0.04
	73 ± 1	25.9 ± 0.3	0.81 ± 0.04
	77 ± 1	22.3 ± 0.2	0.44 ± 0.04
TM.03.G.767	88 ± 1	11.0 ± 0.1	0.61 ± 0.04
	87 ± 1	12.5 ± 0.1	0.69 ± 0.04
	89 ± 1	10.7 ± 0.1	0.55 ± 0.04
	89 ± 1	10.9 ± 0.1	0.41 ± 0.04
TM.03.G.771-a	71 ± 1	27.8 ± 0.3	1.41 ± 0.04
	68 ± 1	29.9 ± 0.3	2.04 ± 0.04
	68 ± 1	30.7 ± 0.3	1.70 ± 0.04
TM.03.G.771-c	77 ± 1	21.7 ± 0.2	1.19 ± 0.04
	78 ± 1	21.1 ± 0.2	1.29 ± 0.04
TM.03.G.771-d	91 ± 1	9.2 ± 0.1	0.21 ± 0.04
	86 ± 1	13.2 ± 0.1	0.41 ± 0.04
TM.03.G.771-i	75 ± 1	24.4 ± 0.2	0.61 ± 0.04
	72 ± 1	27.6 ± 0.3	0.69 ± 0.04
TM.03.G.785	86 ± 1	13.5 ± 0.3	0.90 ± 0.04
	86 ± 1	13.4 ± 0.3	0.86 ± 0.04
TM.03.G.795	81 ± 1	17.8 ± 0.2	1.28 ± 0.04
	81 ± 1	17.9 ± 0.2	1.13 ± 0.04
	83 ± 1	16.4 ± 0.3	0.36 ± 0.04
	83 ± 1	15.8 ± 0.3	1.20 ± 0.04
TM.03.G.797	77 ± 1	22.2 ± 0.2	0.44 ± 0.04
	76 ± 1	23.1 ± 0.2	0.55 ± 0.04
TM.03.G.868	75 ± 1	24.2 ± 0.3	1.30 ± 0.04
	75 ± 1	23.9 ± 0.3	1.33 ± 0.04

Table 20.3. Concentrations of gold, silver, and copper obtained by Energy Dispersive X-ray Fluorescence analysis. The measured values were normalized to one hundred and are given in percent of the total weight (wt. %).

Cl	Ca	Fe	Cu	Zn	Sn
11 ± 1	bdl	bdl	87,4 ± 0,3	0,46 ± 0,04	0,7 ± 0,8
9 ± 1	9,9 ± 0,4	0,2 ± 0,3	78,0 ± 0,3	0,63 ± 0,04	1,9 ± 0,8
12 ± 1	1,2 ± 0,2	0,6 ± 0,3	85,8 ± 0,3	0,59 ± 0,04	bdl

Table 20.4. Elemental composition of the TM.83.G.378 finding obtained by Energy Dispersive X-ray Fluorescence analysis. The values are given in percent of the total weight (wt. %) (bdl = below the detection limit).

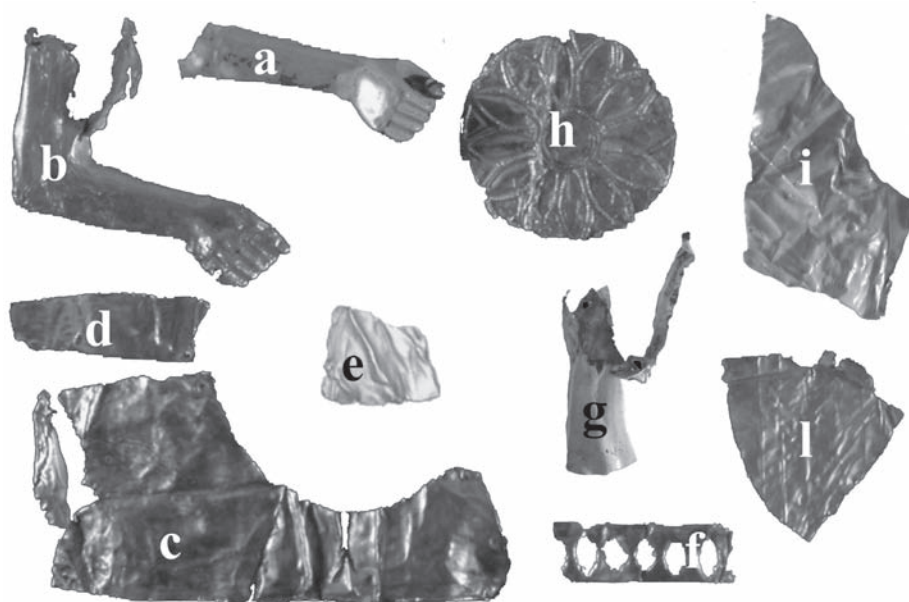


Figure 20.1. General view of the golden objects analyzed.

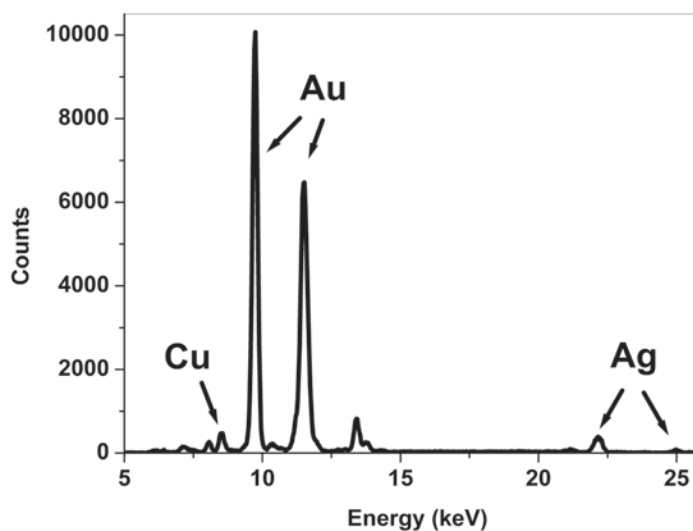


Figure 20.2. Energy Dispersive X-Ray Fluorescence spectrum measured on the TM.03.G.600 find. The characteristic lines of gold (Au), silver (Ag), and copper (Cu) are shown.

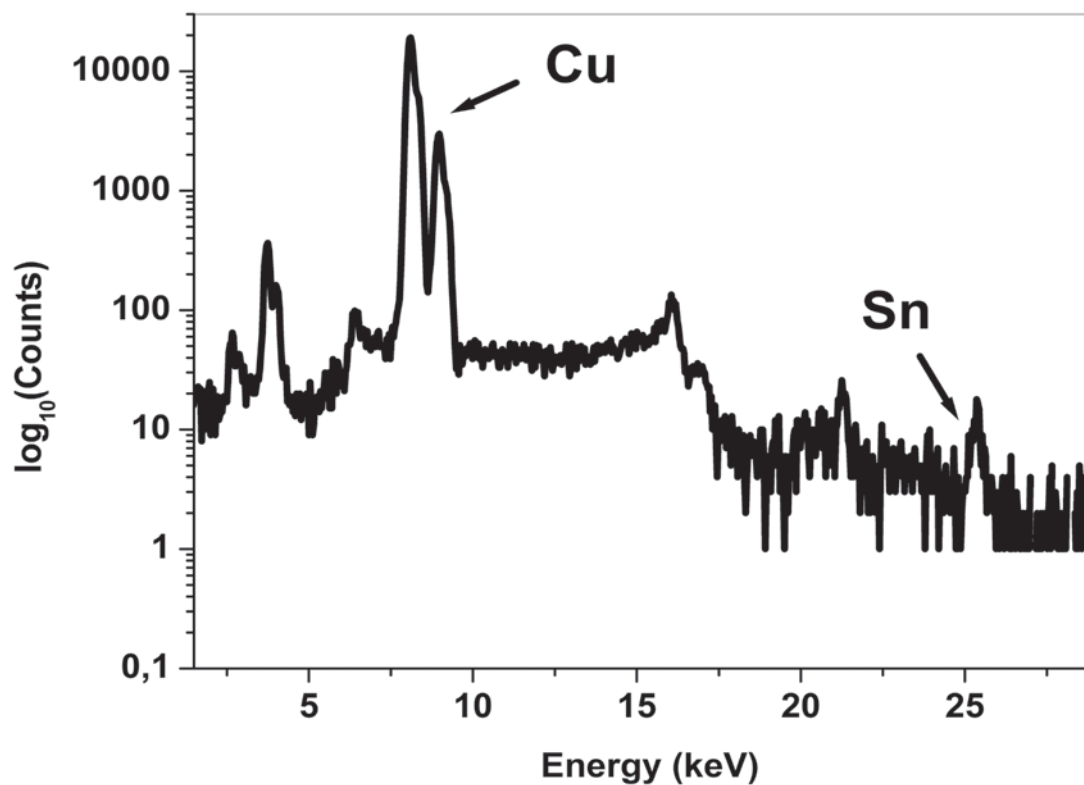


Figure 20.3. Energy Dispersive X-ray Fluorescence spectrum measured on the TM.83.G.378 find. The characteristic lines of copper (Cu) and tin (Sn) are shown.

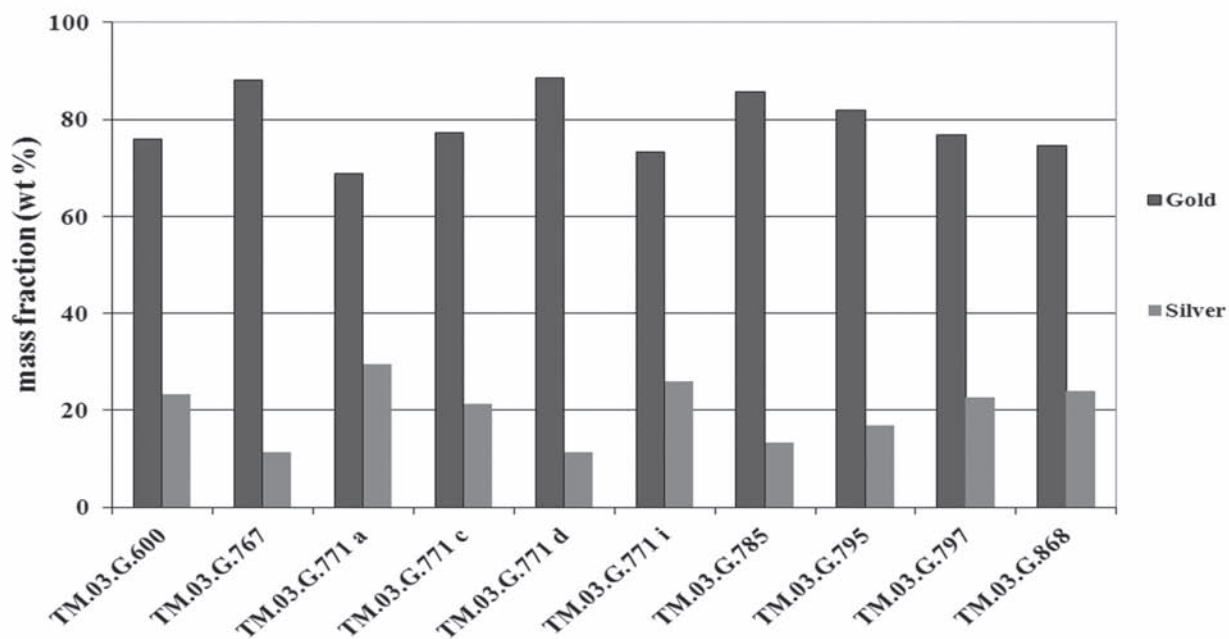


Figure 20.4. Histogram of gold and silver concentrations; the values are given in percent of the total weight (wt. %).

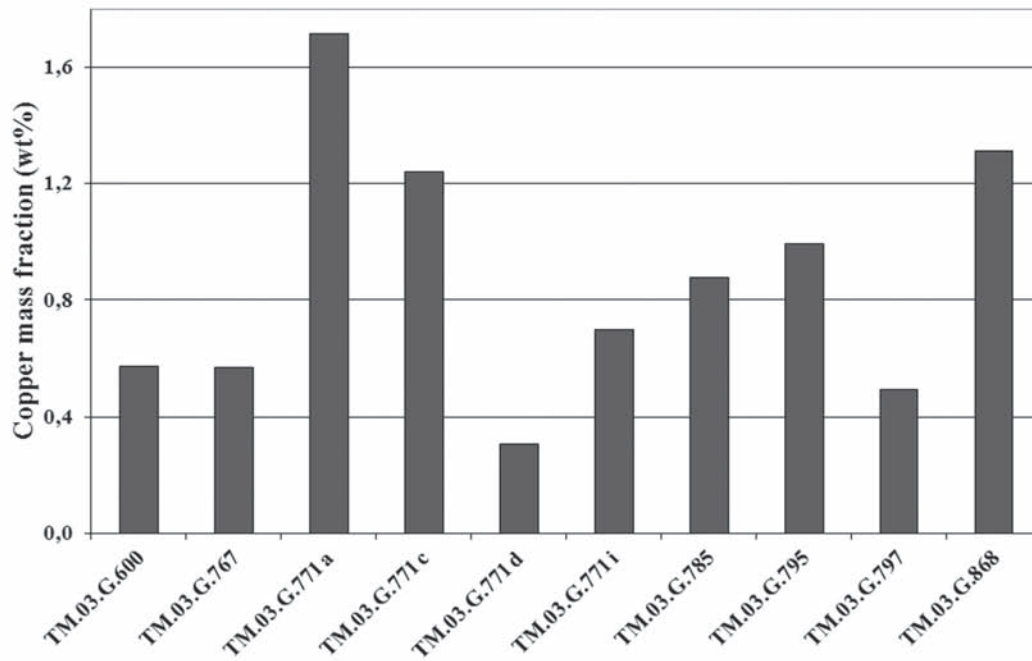


Figure 20.5. Histogram of copper concentrations; the values are given in percent of the total weight (wt. %).

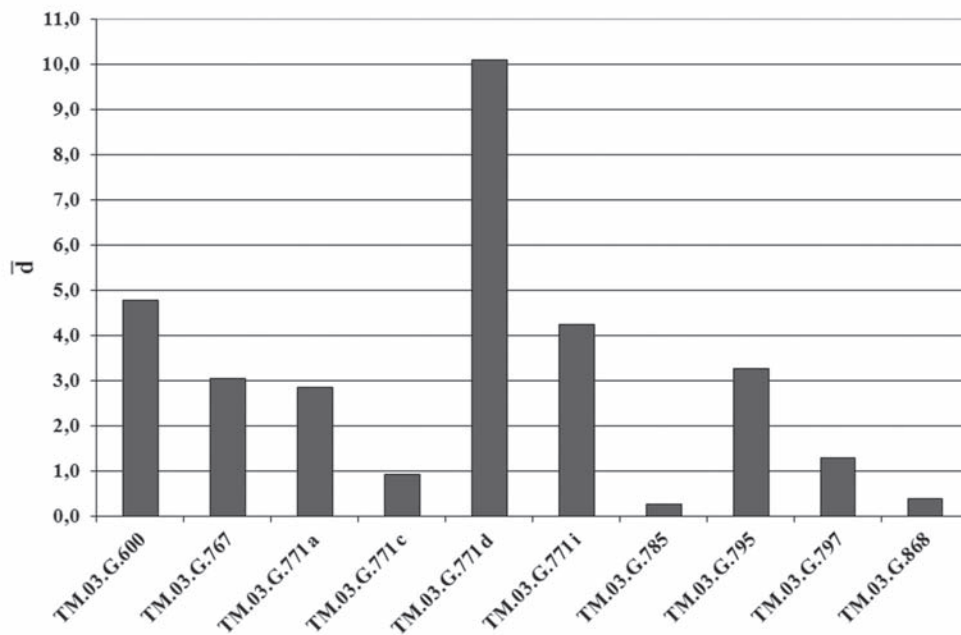


Figure 20.6. Histogram of the mean total elemental variability of the gold–silver alloy ($\bar{d}$); the values are given in percent (%).

CHAPTER 21

ARCHAEOMETRICAL ANALYSIS OF POTTERY PRODUCTION AT EB III-IVA EBLA AND TELL TUQAN

M.L. Santarelli

1. INTRODUCTION

This paper focuses on the analysis and characterization of a relatively large sample of sherds, dated to the Early Bronze Age period and coming from the sites of Ebla and Tell Tuqan.

The analysis has been conducted on selected materials belonging to different wares (Simple, Cooking, and Preservation Wares) and vessel shapes. EBA pottery assemblages from Ebla and Tell Tuqan come, respectively, from Royal Palace G and from the deep stratigraphic sounding of Area P South (see Baffi and Peyronel, in this volume). The latter is dated to the EB III period, while all selected materials from Ebla pertain to the EB IV A destruction levels of Royal Palace G.

The aim of this study is to identify technological features and differences in composition of these materials. The comparison between these two assemblages aimed, through archaeometric studies, at identifying the differences and/or similarities in manufacturing techniques (e.g., firing temperature) and in the nature and treatment of raw materials.

2. EXPERIMENTAL APPROACH

The description of the analyzed samples is reported in [Table 21.1](#). In order to characterize the fragments, all samples were submitted to microscopic observation in thin and thick sections. They were analyzed with a Nikon petrographic

microscope Optiphot 2000 (magnitude: 100x and 200x) and an Euromex stereo microscope (magnitude: 7x–45x). Moreover, in order to quantify their composition, all samples were investigated by thermogravimetry analysis (TGA) combined with differential scanning calorimetry (DSC), TA instruments Q series SDT 6000. The analyses were performed using a heating rate of 10°C/min until 1000°C in air atmosphere (Chiari, Santarelli, and Torracca 1992; 1996; Bonora et al. 2003; Burrigato et al. 2003). In this way, the compounds present in a sample were identified and quantified following the thermal effects, generally decompositions. Further, XRD analyses (Philips diffractometer PW1830 DY3558, Cu λ $\text{K}\alpha$ 1.540598, 40kV, 30mA) were used to determine the mineral composition of the samples.

3. RESULTS AND DISCUSSION

Data concerning analyzed samples are shown in [Tables 21.1–2](#) and [Figures 21.1–3](#). The TGA/DSC values reveal for all samples the presence of calcium carbonate in different percentages ([Figures 21.1–3](#)). Other effects are not present, except the loss of water from silicates of the clay. The water is lost slowly during the analysis; this is not due to a specific effect, but to the presence of amorphous silicates deriving from the raw materials and from the firing process. Specific losses of water from crystallized silicates are not present. The XRD analyses and the

microscopy observation reveal the presence of quartz and hematite (sometimes in traces) in all samples. Otherwise, the presence of basalt is not confirmed in all analyses. Data yielded from the analysis allow to define four groups (§§ 3.1–3.4). Analyses carried out by Lazzarini and Colombo (1995) on EB IVA pottery from Royal Palace G show similar results.

3.1. Basalt-Rich Sample

The sample TM.83.G.341/92 (Figure 21.1:2) shows a small percentage of calcite but it is rich in augite and quartz. The basaltic fragments, as well as hematite fragments, are visible in the sections. According to other authors (ibidem; Maritan et al. 2005) the gehlenite is formed during the firing process at a temperature of around 850°C. We ascribe the beige/greenish color of the matrix to the origin of the raw material and not to the atmospheric condition of the firing. The sample analyzed pertain to a jar of the EB IVA period coming from Royal Palace G.

3.2. Limestone-Rich Basaltic-Bearing Samples

The samples TM.82.G.515/4 (Figure 21.1:3), TM.83.G.102/6 (Figure 21.2:1), TM.83.G.310/1 (Figure 3:2), TM.83.G.507/19 (Figure 3:4), TM.83.G.341/106 (Figure 21.3:1), and TT.10.P.446/1 (Figure 21.2:3), are characterized by the presence of calcite in high percentage (around 12–20 percent) and by the presence of basaltic aggregate. Augite and quartz are attested in all samples, and in some cases (TM.82.G.515/4, TM.83.G.310/1, TT.10.P.446/1) albite is also present. In all samples hematite is observed, whereas gehlenite is not found in TM.82.G.515/4, TM.83.G.341/106, TM.83.G.310/1. The color of the matrices changes in relation to the origin of the raw materials. In fact, we can distinguish samples with beige/greenish matrix (TM.83.G.102/6, TT.10.P.446/1), whose color is due to the type of clay, and not to the atmospheric condition of the firing. This group comprises sherds belonging to Simple and Painted Simple Ware, Preservation Ware and

Kitchen Ware. Analyzed samples pertain to EB III and EB IVA periods.

3.3. Limestone-Rich Samples

The samples TM.82.G.530/20 (Figure 21.1:1), TM.83.G.462/1 (Figure 21.2:2), TT.10.P.426/5 (Figure 21.1:4), TT.10.P.467/1 (Figure 21.2:6), TT.10.P.703/4 (Figure 21.3:3), and TT.09.P.421/10 (Figure 21.3:5) show a large percentage of calcite (>20 percent). In the sample TT.10.P.703/4, pertaining to Kitchen Ware, its percentage is 44 percent. The gehlenite is present in all samples, except in TT.10.P.703/4. In all samples quartz, as well as the hematite, is present, while the albite can be observed in two samples from Tell Tuqan (TT.10.P.426/5 and TT.10.P.467/1). This group comprise sherds belonging to Simple and Painted Simple Ware, Preservation Ware and Kitchen Ware; four of these samples, coming from Tell Tuqan, are dated to EB III period, while the remaining two come from EB IVA levels of Ebla Royal Palace G.

3.4. Quartz-Rich Samples

The samples TM.83.G.325/17 (Figure 21.2:5), TT.10.P.496/14 (Figure 21.1:6), TT.10.P.496/18 (Figure 21.1:5), and TT.10.P.700/1 (Figure 21.2:4) are characterized by the presence of quartz and calcite, though in low percentages (<15 percent). In all cases augite is present, except in TT.10.P.496/14, while gehlenite and hematite are always observed. This group includes sherds belonging to Preservation and Simple Ware from Ebla (EB IVA) and Tell Tuqan (EB III).

4. FIRING TEMPERATURES

Observing the presence of gehlenite in relation to the presence of calcite, we can get some information about firing temperatures. In fact, gehlenite is formed around 850°C, when calcite should be completely decomposed (700–750°C). The simultaneous presence of two compounds reveals that a high temperature was reached during firing, but not long enough to allow the

total decomposition of calcium carbonate. When gehlenite is present in traces, we can suppose that the firing temperature was around 850°C, and for a short time. In [Table 21.2](#) possible evaluations of the firing temperatures are reported.

Moreover, the firing temperature can be correlated to the vessel's function. Kitchen Ware, for example, was fired at a lower temperature than the other wares. In fact, in the three samples of Kitchen Ware gehlenite is not present. In the other wares, only in sample TM.82.G.515/4 gehlenite is absent.

As to the atmospheric condition of the firing, in several samples we can observe the presence of a darker core. This was due to the fact that at the beginning of the firing a reductive atmosphere was created, which at the end began oxidative. In the Kitchen Wares the darker color is related to their use (Mannoni and Giannichedda 2003; Santarelli 2012).

Generally speaking, a diffuse porosity was observed in the samples, due to the presence of air in the clay not properly prepared. In some cases, the pores are stretched and parallel to the surface of the sherds. This effect is related to the clay manufacturing process with potter's wheel.

5. CONCLUSIONS

The comparison between the potsherds excavated in Ebla and in Tell Tuqan did not reveal any significant difference as far as raw

materials and manufacturing processes are concerned. The original clays, used to produce the wares from both Ebla and Tell Tuqan, were characteristic of the area (alluvial clays derived from carsic phenomena and basaltic weathering) and some specific minerals (e.g., the presence of albite) may be useful to identify the original clay source in future studies. In particular, the presence of two different kinds of clay was evident by observing the final color of the ware (greenish or reddish). Moreover, it can be concluded that the aggregates derived from basaltic sands and limestones and that they were generally used as fine grains both in Kitchen Wares (medium/fine) and in other wares (fine).

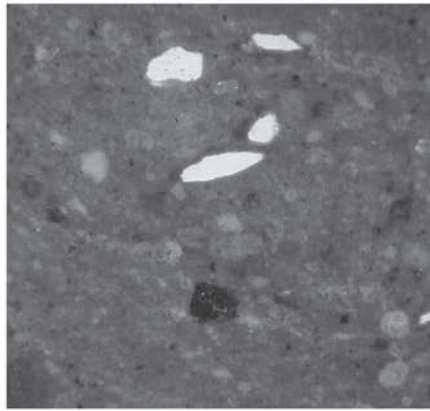
As to the manufacture, the technology used at both archaeological sites was fundamentally the same. All Simple and Preservation Wares were fired at high temperature (except for one sample considered imported by the archaeologists), whereas lower temperatures were used for the Kitchen Wares. We can therefore assume that such difference is closely related to their use. In fact, we can classify pottery as being Kitchen Ware or non-Kitchen Ware. The main use of the latter class is as containers (i.e., beakers, jugs, jars etc.) and a higher mechanical resistance is required. To obtain such resistance the refractory behavior must be increased, and this requires a higher firing temperature. On the other hand, these properties are not needed for Kitchen Wares, and the thermal shock when used directly on a flame is avoided.

PRESERVATION WARE	
EBLA	TUQAN
TM.82.G.530/20	TT.10.P.426/5
TM.83.G.341/92	TT.10.P.496/14
TM.82.G.515/4	TT.10.P.496/18
SIMPLE WARE (cups and beakers)	
TM.83.G.102/6	TT.10.P.446/1
TM.83.G.462/1	TT.10.P.700/1
SIMPLE WARE (large bowls, dishes, jugs)	
TM.83.G.325/17	TT.10.P.467/1
KITCHEN WARE	
TM.83.G.341/106	TT.10.P.703/4
TM.83.G.310/1	
PAINTED SIMPLE WARE	
TM.83.G.507/19	TT.09.P.421/10

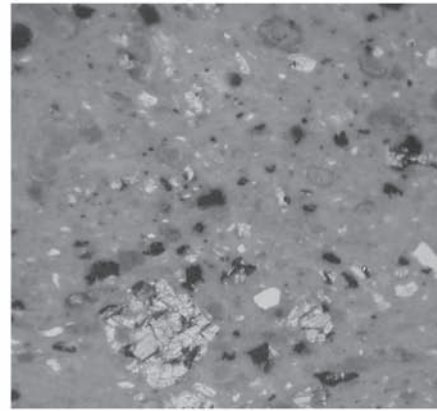
Table 21.1. Description of the analyzed samples.

SAMPLE	GEHLENITE	CALCITE (%)	USE OF THE WARE	FIRING TEMPERATURE (°C)
TM.82.G.530/20	(t)	29.3	Preservation Ware	~850 briefly
TM.83.G.341/92	yes	6.1	Preservation Ware	~850
TM.82.G.515/4	no	15.9	Preservation Ware	700/750
TT.10.P.426/5	(t)	41.5	Preservation Ware	~850 briefly
TT.10.P.496/14	(t)	13.4	Preservation Ware	~850 briefly
TT.10.P.496/18	yes	12.5	Preservation Ware	~850
TM.83.G.102/6	yes	13.2	Simple Ware	~850
TM.83.G.462/1	yes	25.6	Simple Ware	~850
TT.10.P.446/1	yes	13.4	Simple Ware	~850
TT.10.P.700/1	yes	12.0	Simple Ware	~850
TM.83.G.325/17	yes	12.5	Simple Ware	~850
TT.10.P.467/1	yes	26.1	Simple Ware	~850
TM.83.G.341/106	no	19.0	Kitchen Ware	700/750
TM.83.G.310/1	no	11.6	Kitchen Ware	700/750
TT.10.P.703/4	no	44.5	Kitchen Ware	700/750
TM.83.G.507/19	yes	19.9	Painted Simple Ware	~850
TT.09.P.421/10	yes	29.0	Painted Simple Ware	~850

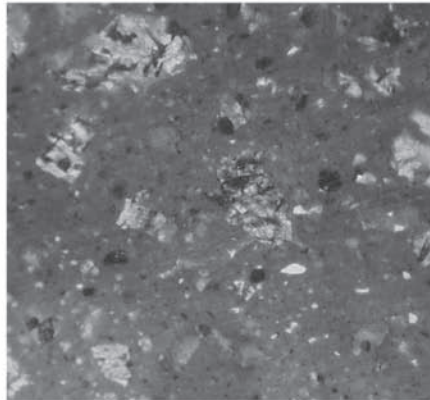
Table 21.2. Determination of the firing temperature. (t)=trace



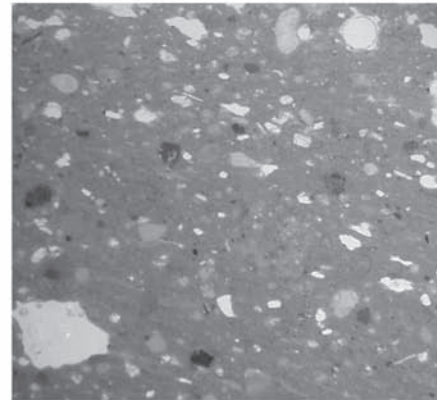
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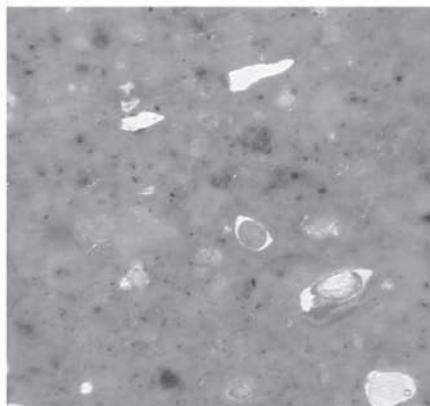
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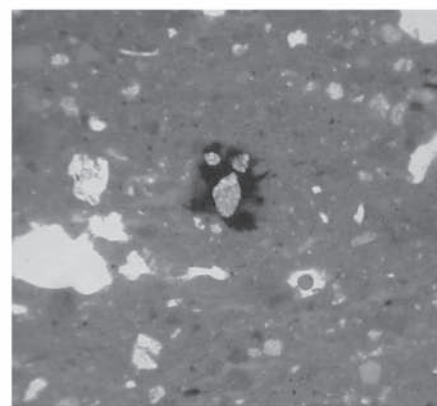
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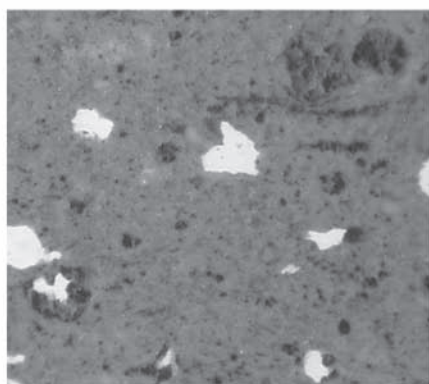


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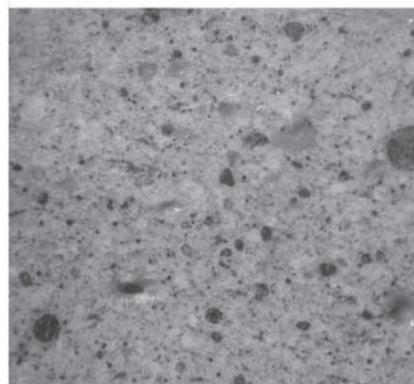
Figure 21.1. Thick sections of Preservation Ware samples from Ebla and Tell Tuqan.

PRESERVATION WARE				
SAMPLE	Figure	TGA %WT CaCO_3	XRD	SECTIONS
TM.82.G.530/20	21.1:1	29.3	Quartz Gehlenite (t) Calcite Hematite (t)	Reddish colour Diffuse porosity Basaltic/carbonatic aggregate (medium-fine)
TM.83.G.341/92	21.1:2	6.1	Quartz Gehlenite Augite Calcite Hematite (t) Magnetite (t)	Beige/greenish colour Diffuse small porosity Basaltic aggregate (medium-fine).
TM.82.G.515/4	21.1:3	15.9	Quartz, Albite Calcite Hematite	Reddish with darker core colour Diffuse small porosity Basaltic/carbonatic aggregate (fine)
TT.10.P.426/5	21.1:4	41.5	Calcite Quartz Gehlenite (t) Zeolites Albite Hematite (t)	Reddish colour Diffuse small porosity Carbonatic aggregate with quartzitic sand (fine)
TT.10.P.496/18	21.1:5	12.5	Quartz Calcite Augite Gehlenite Hematite	Beige/greenish colour Diffuse porosity Quartzitic/basaltic aggregate (fine)
TT.10.P.496/14	21.1:6	13.4	Calcite Quartz Gehlenite (t) Mica Hematite (t)	Pinkish colour Diffuse porosity Quartzitic aggregate (medium-fine)

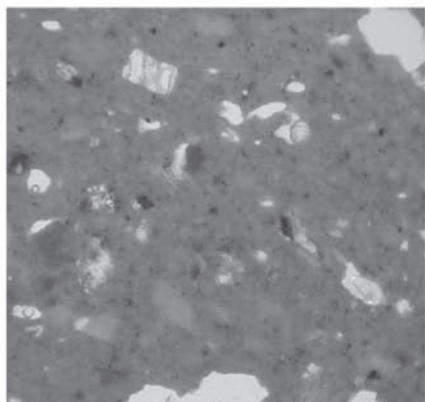
(t)=trace



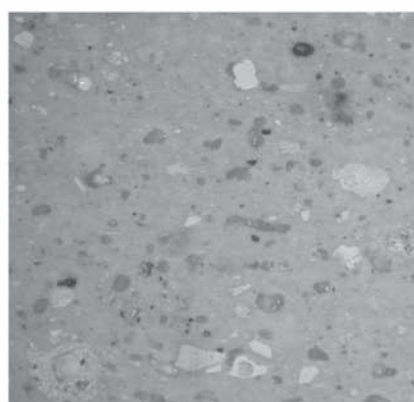
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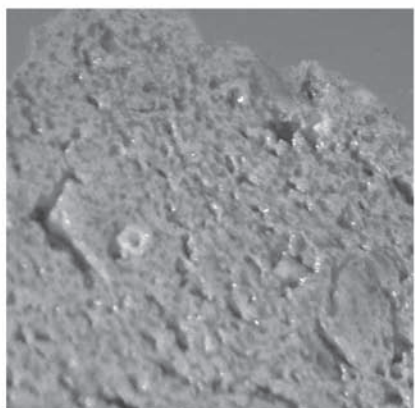
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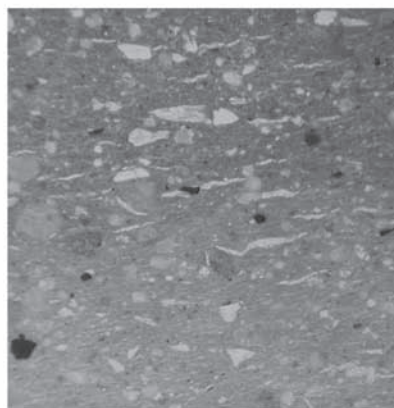
3



4



5



6

Figure 21.2. Thick sections of Simple Ware samples from Ebla and Tell Tuqan.

SIMPLE WARE				
SAMPLE	FIGURE	TGA %WT CaCO ₃	XRD	SECTIONS
TM.83.G.102/6	21.2:1	13.2	Quartz Calcite Augite Gehlenite Mica Hematite	Beige/greenish colour Large diffuse porosity Basaltic aggregate (fine)
TM.83.G.462/1	21.2:2	25.6	Calcite Quartz Augite Gehlenite Hematite	Beige/greenish colour Diffuse small porosity Basaltic/carbonatic aggregate (fine)
TT.10.P.446/1	21.2:3	13.4	Quartz Calcite Gehlenite Augite Albite Piroxenes Hematite	Beige colour Large diffuse porosity Quartzitic/basaltic aggregate (fine)
TT.10.P.700/1	21.2:4	12.0	Quartz, Augite Gehlenite Calcite Hematite	Beige/greenish colour Small porosity Quartzitic aggregate (fine)
TM.83.G.325/17	21.2:5	12.5	Quartz Calcite Augite Gehlenite Hematite	Pinkish colour Large diffuse porosity Quartzitic aggregate (fine)
TT.10.P.467/1	21.2:6	26.1	Quartz Gehlenite Calcite Albite Augite Hematite	Reddish colour with darker core Porosity parallel to the surface Basaltic/carbonatic aggregate (fine)

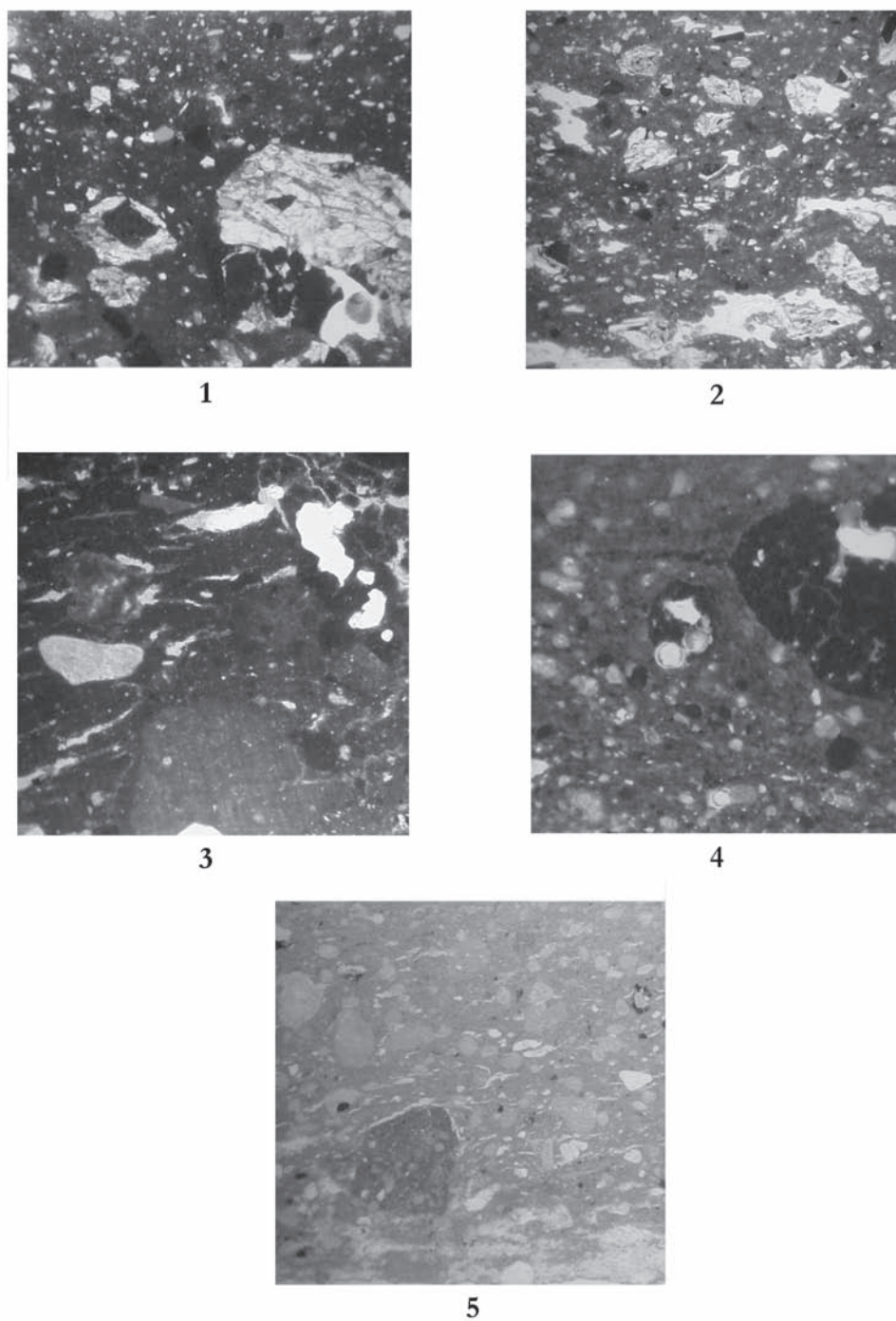


Figure 21.3. Thick sections of Kitchen Ware (1–3) and Painted Simple Ware (4–5) samples from Ebla and Tell Tuqan.

KITCHEN WARE				
SAMPLE	FIGURE	TGA %WT CaCO ₃	XRD	SECTIONS
TM.83.G.341/106	21.3:1	19.0	Calcite Quarzo Augite Mica Magnetite (t) Hematite (t)	Brown colour with reddish core Diffuse porosity Carbonatic/basaltic aggregate (medium-fine)
TM.83.G.462/1	21.3:2	11.6	Quarzo Calcite Albite Augite Hematite (t)	Reddish colour with darker core Large diffuse porosity Basaltic aggregate (medium-fine)
TT.10.P.703/4	21.3:3	44.5	Calcite Quarzo Illite Hematite (t)	Brown reddish colour Diffuse porosity, parallel with the surface Carbonatic aggregate (large)
PAINTED SIMPLE WARE				
SAMPLE	FIGURE	TGA %WT CaCO ₃	XRD	SECTIONS
TM.83.G.507/19	21.3:4	19.9	Quartz Calcite Gehlenite Augite (t) Spinel Hematite (t)	Brown pinkish colour Large diffuse porosity Basaltic/carbonatic aggregate (medium-fine)
TT.09.P.421/10	21.3:5	29.0	Calcite Quartz Augite Gehlenite Hematite	Reddish colour Rare porosity Carbonatic aggregate (medium-fine)

(t)=trace

CHAPTER 22

ARCHAEOMETRICAL ANALYSIS OF ARCHITECTURAL COMPONENTS OF ROYAL PALACE G

M.L. Santarelli and G. Spreafico

1. THE ARCHAEOLOGICAL CONTEXT¹

The structures of Ebla dating to the Early Bronze IVA (ca. 2400–2300 B.C.) show a particularly accurate building technique. This appears evident in the remains of Royal Palace brought to light in a good state of preservation in area G, sealed under the thick destruction layers that are a consequence of the capture of the mature Early Syrian town. Most of the walls still stand to a height of 2.50–4.50 m, with a maximum preserved height of 7.10 m.

Royal Palace G was built using the traditional mud-brick building techniques, well documented in the ancient Near Eastern architecture and still in use until modern times (Fathy 1970; 1986; Sweet 1974; Facey 1997). Rectangular sun-dried mud bricks (ca. 60x40x12 cm), composed by earth, water, and chopped straw, were set with a clay mortar on a low stone foundation of local limestone, consisting of rough blocks laid in courses. The wall surfaces were then covered with a whitish lime plaster, used as a beautifying and protecting element for the brickwork. Several stone staircases connecting the lower and the upper sectors of the Palace and smooth hard lime floors carefully laid, approximately 5–7 cm thick, complete the picture of the architectural remains preserved in area G, since the upper portion of the walls and the wood used for inter-level ceilings and supporting or roofing elements were not preserved. These architectural parts are documented by the large amount of bricks and

charred wooden materials found collapsed in the destruction layers sealing the building complex. Their presence can be also inferred from indirect evidence. For example, the presence of wooden columns supporting the porches on the eastern and northern sides of the Court of Audience is indicated by the regular holes and the stone bases found embedded in the floor of the court (Matthiae 1976, 195, fig. 3; 1995a, 69–94; 2010b, 64–93).

In past as well as in present times, mud bricks were usually produced mixing earth with water and some tempering element, such as chopped straw (like in Ebla), grain chaff, sand, gravel, or dung (Aurenche 1977, 40–42; Wright 1985, 352–58; Reich 1992, 5–7; Politis 1993; Moorey 1994, 304–9; Sauvage 1998, 17–21; Leriche 2000; Cooke 2010, 8–15).² The clay contained in the earth acts as a binding material thanks to its adhesiveness. The straw is useful for tempering the clay, reducing the shrinkage of the brick and preventing it from cracking and breaking up as it dries, but it also serves other functions. It improves the compressive and tensile strength of the brick, acting as a mechanical binding factor, and helps conducting the moisture to the brick surface during the drying process (Houben and Guillaud 1994, 82–83; Facey 1997, 84).

The stone foundation helps to prevent the moisture from rising from the soil into the wall and damaging the mud-brick structure. The rising damp is especially detrimental to thick

walls, as the faces dry more quickly than the core and this can cause a slow, gradual detachment of the outer surface. For this reason the ancient builders tended to adapt the stone size, the height of foundations, and the accuracy in masonry according to the mud-brick walls thickness and the expected soil damp, as we can notice also in Royal Palace G of Ebla, where the stone foundations were more or less solid depending on static questions, wall size and function, and ground conditions (the stone foundations are different for partition and main walls, for walls founded on the flat ground of the Lower Town and retaining walls built on the slopes of the Acropolis, etc.). As a general rule the stone structure consisted of two faces of roughly hewn limestone blocks with few small stones filling gaps and a core of rubble stones and earth.

In many cases the stone foundations were not visible at the moment of the excavation, since they and the upstanding brick walls were equally covered by a whitish plaster. The wall rendering shows a very accurate surface finishing, suggesting a clear beautifying purpose and providing in some cases a contrasting background for the wonderful composite wall panels of wood decorated with gold leaf and shell, limestone, lapis lazuli, and steatite inlays, or with the addition of marble inlays, which adorned the walls of the most important quarters of the building complex (Matthiae 1995a, 85, 100–1, 112–13, plates 44, 51–52, 57–59; 2010b, 83, 152–67, figs. 70–71, 73, 75–79, plates X–XI; Matthiae, Pinnock, and Scandone Matthiae 1995, 274–79, 301–14, 320–24). Since the excavations did not bring to light the external walls of Royal Palace G,³ we can infer that the lime plaster was used mainly for its aesthetic value in order to uniform the surface of the internal walls rather than to protect it from the effects of precipitations and wind erosion, as expected for the external façades.⁴

The use of lime plaster for wall and floor rendering is widely attested in the ancient Near East since the Pre-Pottery Neolithic period (Gourdin and Kingery 1975; Kingery, Vandiver, and Prickett 1988). Its presence has

been noticed throughout the history of Anatolia and the Levant, for example at Aşıklı Höyük, Çayönü, Chatal Höyük, Alalakh, Hama, Qatna, Byblos, Tell Ramad, Yiftael, Jericho, Ain Ghazal, Lachish, and Tell Kabri. Laboratory and technological analyses have been recently carried out on the Neolithic wall and floor plasters of Hama (Thuesen and Gwozdz 1982), the plasters dating to the Middle Bronze–Iron Age II period of Lachish (Shimron 2004), and the Late Bronze Age plasters of Qatna (Brysaert 2011).

The lime rendering was usually applied on the wall in several layers, generally laying on two or three coatings of progressively more refined plaster. The first layer had the purpose to make the surface even; the wall face was previously damped in order to prevent the underlying bricks from absorbing the water from the rendering and cracking up. On top of this layer a thinner, more refined lime plaster was applied. The last finishing layer was then laid on. A smooth dense surface could be obtained by polishing or burnishing the coating with some hard tool.⁵ When the rendering had been accomplished, the mud-brick wall appeared covered by a resistant, even whitish surface, while the minute pores in the plaster allowed the structure to continue “breathing,” absorbing and releasing small quantities of moisture during the day.

The technology, manufacture, and composition of Royal Palace G floors testify to technical excellence and to the investment of resources, energies, and materials for both practical and aesthetic purposes.⁶ The floors appear to be constituted of at least two layers. A first layer of crushed limestone was laid on the ground surface previously leveled, forming a suitable bed for the following lime plaster layer that was spread over filling the interstices and providing an even surface. This surface was then strongly compacted, maybe using a stone roller, and probably polished with a stone tool, as we have already noticed for the wall plasters. A similar technique seems to have been observed at Byblos on the Neolithic floors dating to the fifth millennium B.C. (Dunand 1973, 12, fig. 2, plate VI), and at Megiddo on the IA plaster floors—

even though in this case the material employed in floor manufacture is considered to be not burnt lime, but crushed and powdered local limestone (Lamon and Shipton 1939, 17).⁷

In order to investigate and better understand the building techniques, technologies and materials employed in Royal Palace G in Ebla during the EB IVA a set of samples (Table 22.1) collected from various architectural features (floors, bricks walls, and plasters) and originating from different areas of the building complex have been submitted to laboratory analysis. The floor elements were sampled from the original floors brought to light inside the rooms L.3471 and L.3031 of the Southern Quarter. The brick and wall plaster fragments were sampled from the collapsed materials originating from the upper portion of the walls, found in the destruction layers (Level 7 in room L.3464 and Level 9 in the grid squares EcV7iii+iv) that sealed the Southern and Western Units of the Central Quarter (Figure 22.1).

2. LABORATORY ANALYSIS

2.1. Analytical Approach

A set of seven samples picked up from the building structures of Royal Palace G, EB IVA, were tested. Table 22.1 shows the characteristic of these samples.

All samples showed a composite structure with different layers. To define their structure all samples were analyzed through microscopy observation; the samples were enclosed in acrylic resins producing thick sections in order to observe and determine the present layers. The sections were analyzed using a Nikon petrographic microscope Optiphot 2000 (magnitude: 100x and 200x) and Euromex stereo microscope (magnitude: 7x–45x).

In order to quantify their composition, all samples were investigated by thermogravimetry analysis (TGA) combined with differential scanning calorimetry (DSC), TA Instruments Q series SDT 6000. The analyses were performed using a heating rate of 10°C/min up to 1000°C in air atmosphere (Chiari, Santarelli, and Torracca

1992; 1996; Bonora et al. 2003; Burragato et al. 2003). In this way, the characteristic thermal effects (generally, decomposition) were examined and the compounds of each sample identified. The analysis also allowed the quantitative determination (weight percentage) of the single compounds. Further, analyses XRD (Philips diffractometer PW1830 DY3558, Cu λ $\text{K}\alpha_1$ =1.540598, 40KV, 30mA) were used to determine the mineral composition of the samples. In some samples (TM.89.G.1_ED, TM.89.G.2a_ED, TM.89.G.2b_ED, TM.89.G.3_ED) a superficial colored layer was present; this was analyzed by FT-infrared spectroscopy (FTIR), Bruker Optics Vertex 70, diamond cell, 4000-400 centimeter-1, resolution 4 centimeter-1 in order to determine the presence of pigments and the nature of their binder.

2.2. Results and Discussion

2.2.1. Floor Samples

The floor samples were well compressed, without fractures and pores. The thick section of the sample TM.83.G.12_ED showed the presence of a single layer composed by a diffuse binder and an aggregate. This aggregate (Plate 27:1) showed carbonate compounds mixed with few clay fragments. No superficial layer was present.

The sample TM.83.G.13_ED was characterized by thick sections in Plate 27:2 (7x). In these, we observed the carbonate aggregate well diffused in a binder. A brown layer was visible on the surface of the sample.

The TGA/DSC analysis showed losses of water from clay materials and loss of carbon dioxide (CO₂) from calcium carbonate. The results are reported in Table 22.2; Figure 22.2 compares the two analyses.

The small percentage of water related to the silicates of clay is justified by the carbonatic nature of the sample. The loss reveals that a little quantity of clay is present, but the sample is to be considered a carbonatic compound. In fact, the weight percentage of calcium carbonate is determined based on the weight loss percentage

of CO₂, and it is 84.7±1 percent for both samples.

The XRD investigations were performed on the same powders used for the TGA/DSC analysis. We observed in their graphs the presence of calcite (the main compound), mica, and zeolite as clay minerals.

All results reveal the presence of a large quantity of calcium carbonate due to the aggregate but also to the binder. The mixture could be produced like a mortar, using a lime. However, this hypothesis should be confirmed by further specific analytical techniques. Moreover, the surfaces are flattened and in a case also colored (visible superficial brown layer).

2.2.2. Plasters

The samples TM.83.G.14_ED, TM.89.G.1_ED, TM.89.G.2a_ED showed the presence of two layers: plaster and colored surface. By contrast, the samples TM.89.G.2b_ED and TM.89.G.3_ED were divided in four layers (Plate 27:3): the mud brick, a first layer of plaster (pink), a second layer of plaster (white), and the colored surface. Under the microscope, the second layer of plasters appeared well compacted, without pores and fractures; the absence of straw and the fine distribution of the aggregate were also noticed. The surface of the last plasters was flattened. In the samples TM.83.G.14_ED and TM.89.G.1_ED the color of this last plaster was a darker pink compared to the other samples, due to the presence of more clay.

As in the previous cases, the TGA/DSC analysis showed losses of water from clay materials and loss of carbon dioxide (CO₂) from calcium carbonate. Table 22.3 reports the results of the TGA/DSC analysis for the first samples of plaster. The composition of the superficial layer is described in another section.

The weight percentage of calcium carbonate is respectively 40.6 percent, 43.3 percent, and 77.2 percent. The higher the calcium carbonate percentage, the lighter the plasters.

Table 22.4 reports the TGA/DSC results of TM.89.G.2b_ED and TM.89.G.3_ED. Each sample is divided in four parts: brick (a), first plaster (b), second plaster (c), and colored layer (d).

The weight percentage loss of CO₂ allows to obtain the percentage of calcium carbonate. Table 22.5 shows a comparison between the calcium carbonate percentages in each layer of the two samples.

The weight percentage loss of CO₂ allows to obtain the percentage of calcium carbonate. Table 22.5 shows a comparison between the calcium carbonate percentages in each layer of the two samples.

The comparison highlights the increase of the calcium carbonate percentage from the brick to the external layer (second plaster) (Figure 22.3). Upon this layer there is the colored layer.

The XRD analysis confirmed the presence of the calcite as a main component. The clay is characterized by the presence of zeolites and mica.

As observed in the floor samples, these preliminary results justified the presence of calcium carbonate with the use of a mixture of clay and lime as a binder, combined with carbonate aggregates. The percentage of lime increased based on the plaster's use. Other investigations can confirm these first results.

2.2.3. Colored Surfaces

The TGA/DSC of the colored surfaces showed a composition of calcium carbonate with small percentage of gypsum (1–5%) mixed to the clay. We can notice that the gypsum is present only in these layers and not in the previous ones. The colors are due to red or black pigments diffuse in the layer. The FTIR spectroscopy confirmed the presence of gypsum (Figure 22.4), calcium carbonate, and silica (clay), but the effects related to a pigment were not identified. Probably, they are hematite pigments (red color) or carbon pigments (black color). The ochre and carbon pigments are not easy visible in the

FTIR spectra and they need to be analyzed with other spectroscopic techniques (i.e., Raman spectroscopy). These layers were applied upon the last plasters and flattened.

3. CONCLUSIONS

The analyses carried out on the samples of bricks, floors, and wall plasters collected from Royal Palace G of Ebla represent a first step towards an understanding of the technology involved with the building of the EB IVA complex. The preliminary results obtained show a high technological level in the manufacture of wall plasters and floor rendering.

In all samples a high percentage of calcium carbonate has been detected. The presence of calcium carbonate in the mud bricks (ca. 37–43%) suggests the choice of a source soil with a high content of these materials, to which more calcium carbonate materials was perhaps added. Calcium carbonate helped to harden the earth mix, improving its strength (Cooke 2010, 13).

The percentage of calcium carbonate is much more relevant in the floor samples (ca. 84%) and in the wall plasters (from 63–67% of the first layer to 72% of the second layer), indicating the use of a specific technique and a selective choice of the source material in order to obtain a fine and resistant material.⁸ As we have already noted in the first paragraph, this was done for both a practical and aesthetic purpose, in order to provide the walls and the floors of the palace with an even and strong surface. The prevalent presence of calcium carbonate in the wall and floor plasters raises the question of the use of true burnt lime rather than of crushed and powdered limestone.⁹ Until further analysis confirms these observations, on the ground of the very high percentage of calcium carbonate detected, at the moment it is only possible to conjecture the use of true lime obtained by burning and rehydrating limestone.

The selective choice of the source material appears evident also in the addition of a limited amount of gypsum to the last layer of the wall

plasters, absent in the underlying layers as well as in the floor plasters.

NOTES

- 1 G. Spreafico wrote the paragraph on the archaeological context, M.L. Santarelli wrote the paragraph on laboratory analysis, while the conclusions were written together.
- 2 Laboratory analyses have been carried out on mud bricks from Chatal Höyük, Lachish, Jericho, Tell Batashi, Tell Qasile, and several sites in Jordan (Rosen 1986; 2004; Politis 1993; Cerulli 2000; Love 2012). The results indicate a careful selection of source materials. Besides a basically similar manufacture and composition, some variations in the texture and the components mixed with the usual paste of earth, water, and straw (sand, ash, pebbles, and organic matter such as carbonized seeds, burnt bones, shells, or charcoals) have been recorded.
- 3 The walls facing the open space of the Court of Audience were protected from precipitations and wind by continuous porches, 5.00–5.50 m wide, supported by wooden columns, identified on the northern and the eastern sides of the court (Matthiae 1995a, 82–85, figs. 12–14; 2010b, 79–82).
- 4 The surface rendering of mud-brick walls can vary considerably from a simpler mud coating consisting of earth mixed with straw, sand, or other materials, to a more refined lime plaster. Mud coating is particularly suitable for protecting the external façades. It is easy to produce and apply, making easier the renewals that are regularly required. The great deal of straw employed in it helps to move away rainwater from the wall and plays a reinforcement function. The straw helps to prevent the earth rendering from cracking when it dries and contributes to drain the moisture—rising damp or rainwater seepage—from the core of the wall towards the outside (Facey 1997, 84; www.meda-corpus.net, record B07_SY).
- 5 The practice of laying down the lime plaster in two or three layers has been observed on ancient walls (Asimenos 1978, 573; Shimron 2004, 2623), and it is still well attested in the traditional earth architecture. In modern Syria a smoothed lime rendering is used to coat the interior mud-brick or traditional stone walls (www.meda-corpus.net, record B02-SY). It is interesting to note that in the modern village of Tell Tuqan in Syria the lime wash employed for rendering the walls originated from the soaked local limestone (Sweet

1974, 117). A similar practice has been observed in contemporary Syrian villages, where the limestone is soaked for many days in water to obtain the lime wash for coating the mud-brick walls (www.corpus-meda.net, record A7_SY: 6). Compressing and polishing lime plaster surfaces by means of a hard tool was probably a common technique in the ancient Near East (Kingery, Vandiver, and Prickett 1988, 222, 236; Novák and Pfälzner 2001; Bietak 2007, 280), as well as in modern times.

- 6 The standard kind of flooring in the ancient Near East was the beaten earth floor (Wright 1985, 435), usually found in domestic and unofficial contexts such as workshops, store rooms, and fortification structures. This kind of floor is widely attested also in Ebla, for example in the Middle Bronze Age domestic quarter brought to light in Area B East, southwestern sector of the Lower Town (Baffi 2006b, 78–79; Peyronel 2008a, 181–84; Ascalone, Peyronel, and Spreafico in press).
- 7 The archaeologists of the Oriental Institute of Chicago expedition at Megiddo suggest that the local soft limestone was reduced to a coarse dry material to make the bed layer of the floor. The same limestone was

powdered and mixed with water in order to obtain a finest material useful for the top coating (Lamon and Shipton 1939, 17).

- 8 The source material was widely available in Ebla, where the limestone bedrock appeared in several places close to the surface of the built area. The local limestone was certainly employed to obtain the stone elements used to build the wall foundations, and it must also have been used to make the lime plaster for the Royal Palace G floors and walls.
- 9 For a general discussion of this problem, see Gourdin and Kingery (1975, 134–38), Wright (1985, 370, 437–38), and Kingery, Vandiver, and Prickett (1988, 221–22). The manufacture of true lime involves the burning of limestone at about 750–850°C to obtain a powder (quick lime). By adding water, a paste (slaked lime) with adhesive and plastic properties is obtained, useful for producing mortar or plaster. However, after air-drying “the final calcium carbonate product in the setting of lime plaster has the same chemical composition as the initial pre-fired carbonate material,” that is CaCO_3 (Shimron 2004, 26–21), so that chemical or X-ray diffraction analyses are not able to distinguish between calcined and uncalcined material.

SAMPLE	ROYAL PALACE G QUARTER	LOCUS/GRID SQUARE	LEVEL	MATERIAL
TM.83.G.12_ED	Southern Quarter	L.3471		Floor
TM.83.G.13_ED	Southern Quarter	L.3031		Floor
TM.83.G.14_ED	Central Quarter, Southern Unit	L.3464c	7	Plaster
TM.89.G.1_ED	Central Quarter, Western Unit	EcV7iv	9	Plaster
TM.89.G.2a_ED	Central Quarter, Western Unit	EcV7iii	9	Plaster
TM.89.G.2b_ED	Central Quarter, Western Unit	EcV7iii	9	Brick, plaster
TM.89.G.3_ED	Central Quarter, Western Unit	EcV7iii	9	Brick, plaster

Table 22.1. Analyzed samples.

SAMPLE	WEIGHT LOSS (%)	TEMPERATURE (°C)	DESCRIPTION
TM.83.G.12_ED	3.2	-	Water related to clay material
	37.3	786.4	CO ₂ from calcium carbonate
TM.83.G.13_ED	3.4	-	Water related to clay material
	37.4	776.0	CO ₂ from calcium carbonate

Table 22.2. TGA-DSC results of the floor samples.

SAMPLE	WEIGHT LOSS (%)	TEMPERATURE (°C)	DESCRIPTION
TM.83.G.14_ED	5.6		Water related to clay material
	17.9	741.9	CO ₂ from calcium carbonate
TM.89.G.1_ED	5.3		Water related to clay material
	19.1	717.4	CO ₂ from calcium carbonate
TM.89.G.2a_ED	3.9		Water related to clay material
	34.0	722.5	CO ₂ from calcium carbonate

Table 22.3. TGA/DSC results for first samples of plaster.

SAMPLE	WEIGHT LOSS (%)	TEMPERATURE (°C)	DESCRIPTION
TM.89.G.2b_ED (a)	8.5		Water related to clay material
	18.8	707.1	CO ₂ from calcium carbonate
TM.89.G.2b_ED (b)	7.3		Water related to clay material
	27.9	756.8	CO ₂ from calcium carbonate
TM.89.G.2b_ED (c)	8.2		Water related to clay material
	31.8	737.5	CO ₂ from calcium carbonate
TM.89.G.3_ED (a)	8.6		Water related to clay material
	16.3	770.4	CO ₂ from calcium carbonate
TM.89.G.3_ED (b)	5.2		Water related to clay material
	29.8	759.1	CO ₂ from calcium carbonate
TM.89.G.3_ED (c)	7.8		Water related to clay material
	31.6	754.1	CO ₂ from calcium carbonate

Table 22.4. TGA/DSC results of second samples of plaster.

	TM.89.G.2b_ED	TM.89.G.3_ED
Brick (a)	42.6%	37.0%
First plaster (b)	63.3%	67.6%
Second plaster (c)	72.1%	71.7%

Table 22.5. Comparison between the calcium carbonate in each layer of the samples.

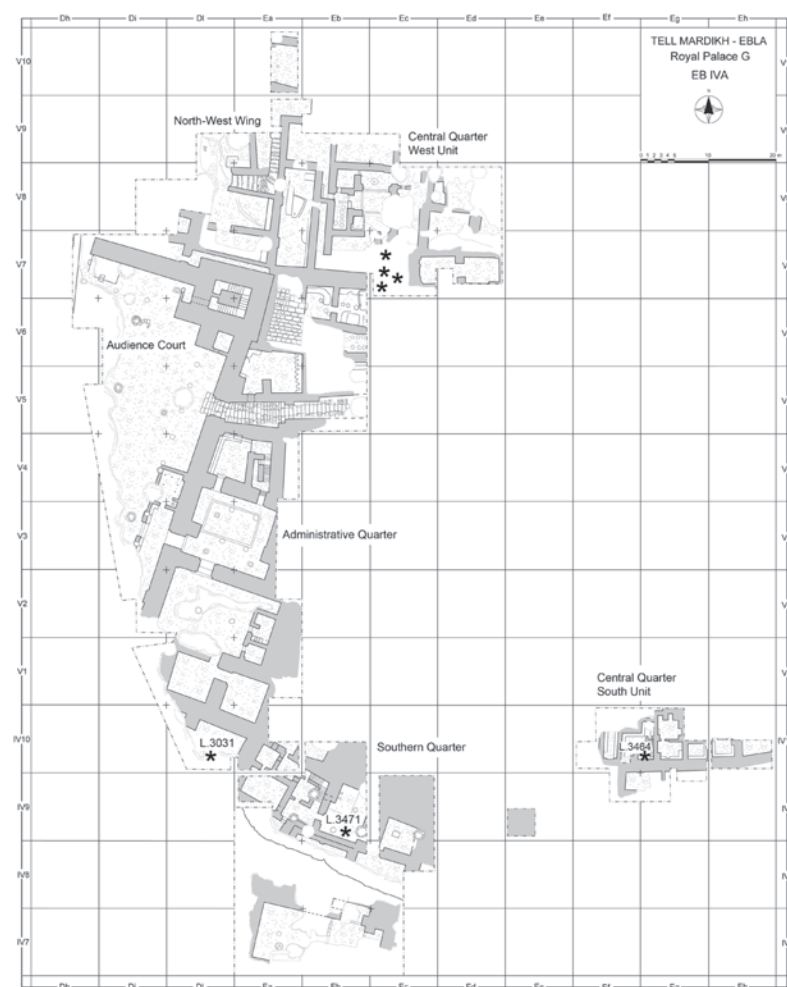


Figure 22.1. Ebla, plan of Royal Palace G, EB IVA. The asterisk indicates the provenance of the samples.

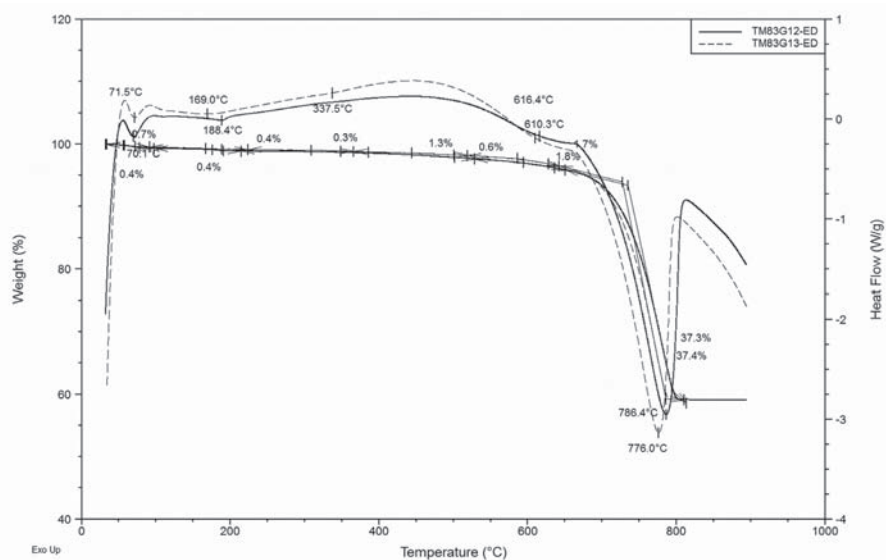


Figure 22.2. Comparison between the TGA/DSC of the floor samples.

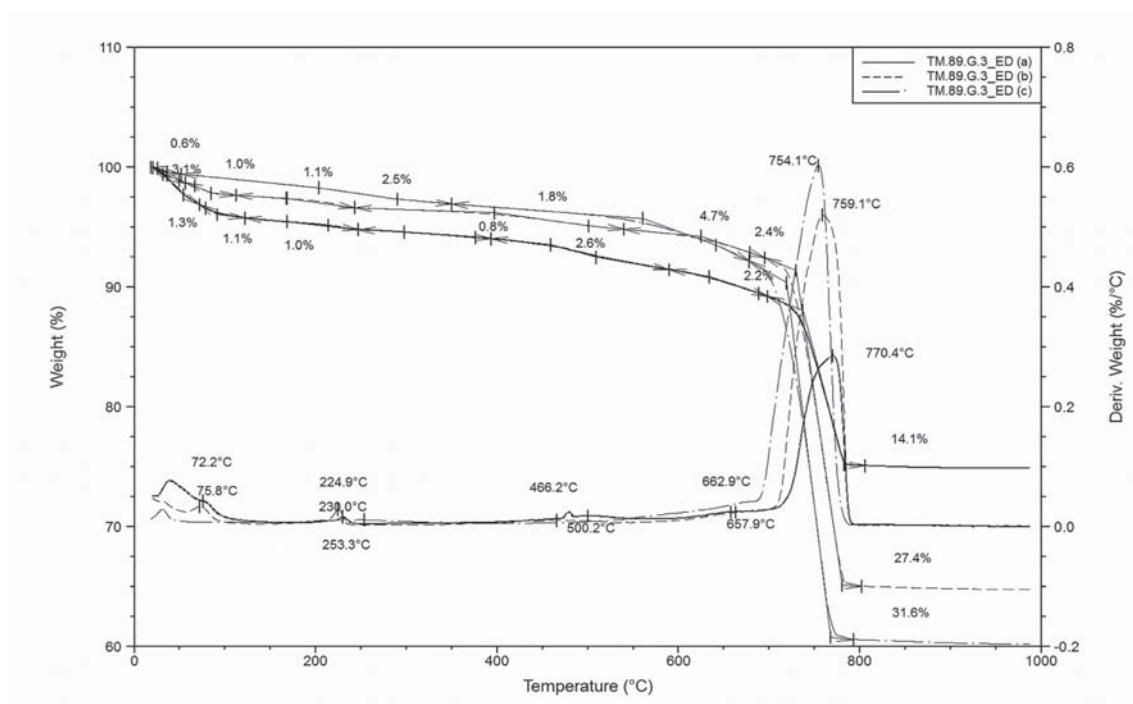


Figure 22.3. Comparison between the layers of the sample TM.89.G.3_ED.

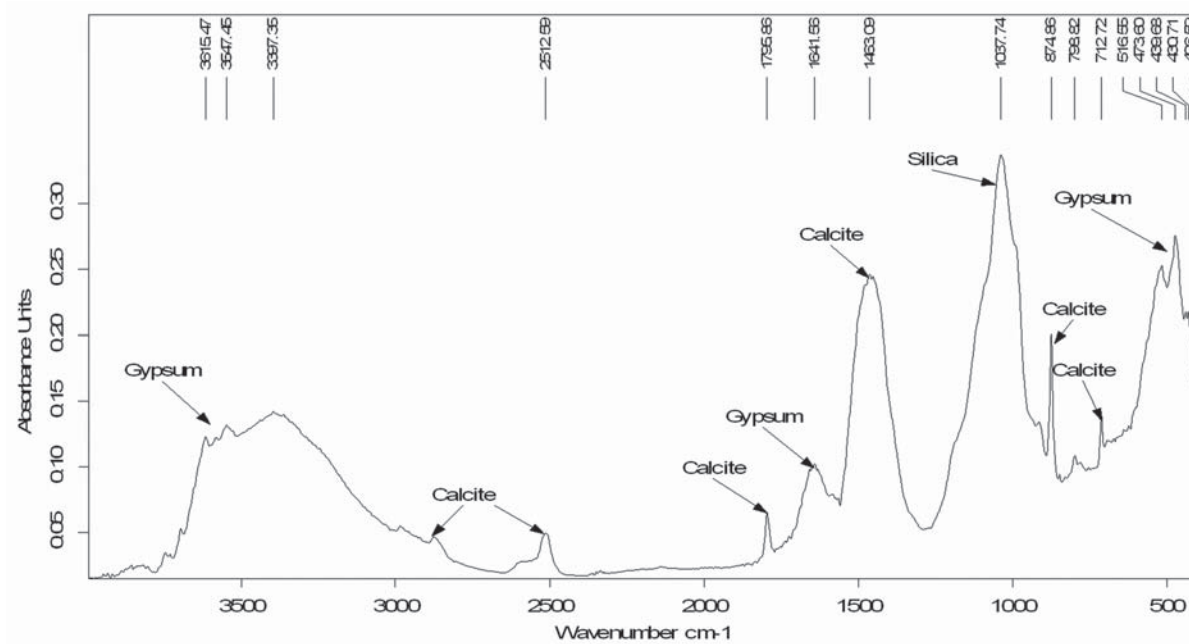


Figure 22.4. FTIR analysis of the superficial colored layer of the sample TM.89.G.3_ED.

CHAPTER 23

CONSUMING PLANTS

Archaeobotanical Samples from Royal Palace G and Building P4

C. Wachter-Sarkady

1. INTRODUCTION¹

This paper presents preliminary results of the analysis of charred archaeobotanical material recovered from the Early Bronze IVA levels at Tell Mardikh/Ebla. A wide range of archaeological contexts in Royal Palace G and Building P4 were sampled in order to better characterize the human activities taking place in them. Needless to say, archaeobotanical studies of Ebla are of special interest, both because of Ebla's role as an important urban centre in third-millennium Syria and because the Eblaite botanical remains can be correlated with an abundant written documentation (see Marchesi, in this volume).

1.1. Archaeobotanical Methods

A total of 345 samples from EB IVA deposits have been analyzed until now. A flotation machine was used to process large amounts of soil. All the samples were entirely floated or dry-sieved using three sieves with 2 mm, 1 mm, and 0.15 mm meshes. The remaining soil in each sieve was also manually sorted by the author. The recovered items were then analyzed in the laboratory with a stereo microscope and classified into four categories: 1) cereals and pulses (grain legumes); 2) oil plants; 3) fruit; and 4) wild flora. The identification was based on drawings, photos, and printed descriptions (Rechinger 1959; Martin and Barkley 1961; Renfrew 1973; van Zeist and Bakker-Heeres 1982a; 1982b; 1984; Körber-Grohne 1988; Cappers, Bekker, and Jans 2006; Nesbitt 2006; Cappers, Neef, and Bekker

2009). In addition, some seeds were compared with modern seeds.

The precision of the identification of charred plant remains depends on how well they are preserved. The majority of the charred seeds from the EB IVA levels have a good preservation condition. A few samples, however, yielded abraded, distorted, or fragmented materials.²

In general, samples from deposit layers in rooms are poor in botanical remains, probably because the houses were kept quite clean (one exception is room L.2890 in Royal Palace G; see dedicated paragraph below). Different concentrations of seeds were found in jars (concentration varying according to the functions of the jars), and higher amounts of plant remains were found in firing places as well as in pits.

About 9,290 seeds were found; most of them have been identified, counted, and grouped into twenty-one families. The results of our identification work are presented in [Tables 23.2–3](#).³ Some images of selected seeds are shown in [Figures 23.1–4](#). As for the nomenclature of the plants, they are indicated with their scientific names. The English equivalents can be seen in [Table 23.5](#).

1.2. Objectives

Both cultivated plants and their associated weed flora can provide information about agricultural practices, such as soil management, harvesting, fallowing, crop-processing/crop-cleaning, storage,

and also about field conditions. Together with charcoal derived from burning wood, wild taxa are a record of the local vegetation. Moreover, archaeobotanical studies aim to find which plants contributed to human diet. This paper attempts to establish which crops were locally grown in Ebla, which plants were primarily brought from neighboring regions, and how storage was arranged within the settlement. We also tried to reconstruct which plants were consumed and which were used for other purposes, such as medicinal applications. Other central archaeological questions concern the human activity within the settlement, the living conditions, and the technological level of the inhabitants. The analyzed botanical samples from Royal Palace G and Building P4 are described according to their related contexts, as for example floors, jars, hearths, and silos. An attempt is also made to reconstruct the function of these contexts. These objectives are pursued by identifying seeds of cultivated plants, waste products of cereal processing such as chaff, and remains of wild plants found in the plant assemblages.⁴ In this connection, it is important to note that the composition of a plant assemblage in a site is always dependent on human decisions and climate situations (Riehl 2009, 93).

2. ROYAL PALACE G

The samples from Royal Palace G were collected from different archaeological contexts, which include burnt layers above the floors of the rooms, fills of pits, hearths, and contents of vessels. All the samples belong to the EB IVA period, except those from S.4843 dating from EB IIIB. Up to now 183 samples/subsamples have been examined from two different quarters within the palace (see Table 23.2): they are described here according to their context, except in the case of S.4843 and L.2890, described separately because of their special importance.

2.1. Silos S.4843

One of the main archaeological features below the Western Unit of Royal Palace G is a large and deep subterranean semicircular

pit (S.4843), a sort of silos lying to the south of the rooms mentioned above (on which see § 2.3). The whole fill of the pit was sampled for archaeobotanical analyses.⁵ To identify possible changes of the fill, the pit was stratigraphically subdivided into three parts according to different excavation levels. The soil matrix was loose and ashy in some parts of the pit, alternated with more compact soil, and mixed with some debris and charcoal, as noted by the author during the excavation.⁶ This pit contains the broadest spectrum of food plants of all the samples taken in this part of the palace. Preservation conditions of the plant remains are very good. Domesticated plants of the pit include mainly cereals, especially barley (*Hordeum vulgare*) in a proportion of 41.9 percent (893 grains), together with emmer (*Triticum dicoccum*) and einkorn (*Triticum monococcum*) in almost equal proportions (3.5 percent each), but with a slight dominance of emmer. Few grains (3) of wild barley/two-row domesticated barley (*Hordeum spontaneum*/*Hordeum distichum*) are present, the species of which cannot be identified by the grain alone. Free-threshing wheat is almost absent; only 5 grains of *Triticum aestivum/durum* were found. The high number of unidentified cereals (1,054) is due to the fact that the grains are mostly fragmented or deformed.⁷ Almost no cereal chaff remains were recovered (only 1 chaff of emmer).

Crops other than cereals also occur, but in smaller numbers; pulses are especially quite well represented, amounting to 26.5 percent (576) of the sample. Until now five legume taxa have been identified; among them, *Lens culinaris* dominates with 400 specimens, while peas (*Pisum sativum*) are fewer but well represented (162). Chickpea (*Cicer arietinum*) and bitter vetch (*Vicia ervilia*) are also found, but with only 2 seeds each; broad beans (*Vicia faba*) are likewise poorly represented (6 seeds). A fairly great number of olive stones (210 = 9.7 percent), 1 woody stalk and 55 pips of *Vitis vinifera* (= 2.5 percent), and 1 seed of pomegranate (*Punica granatum*) complete the picture.

The spectrum of wild seeds includes weeds associated with crop plants such as *Galium*, few grasses (*Avena* cf. *fatua*), some small-seeded *Leguminosae* (*Medicago*, *Scorpiurus muricatus*, *Hippocrepis*),⁸ one capsule of linseed (*Linum usitatissimum*), wild grass pea *Lathyrus sativus*, *Lithospermum*, *Cephalaria syriaca*, *Asteraceae* (*Anthemis*/*Matricaria*, *Carduus*), *Calystegia*, *Chenopodium*, *Sherardia arvensis*, *Crataegus*, *Heliotropium*, *Papilionaceae*, *Malvaceae*, and a few seeds of *Pistacia*.⁹

The most plausible interpretation of S.4843 suggests that the pit was an underground storage for already processed cereals, partially cleaned (since few contaminants were found). It is not in any case a “kitchen rubbish pit.” The use of underground storage pits is attested in Iron Age Palestine, and modern examples are known from Africa (Currid and Navon 1989, 67–78). The dominance of cereal grains and the relative scarcity of weeds/wild seeds, together with the fact that the inner walls of the pit were plastered with clay, suggest an interpretation of this kind. Another fact that supports this hypothesis is that cereal chaff remains were almost absent; had the pit been used as a rubbish pit, much more waste products would have been found.

With regard to the location of the silo, the following remarks may be made. According to ethnographic literature, storage strategies reflect different social and economic organizations. Besides the private storage of grains in jars in the various households, storage for the shared use of the community also occurs, with a distribution based on need or social status. In this case the silo is usually located in the centre of the settlement in an open area near the houses (Garfinkel, Ben-Shlomo, and Kuperman 2009, 321). Silos S.4843 may have been set within a quite similar situation, since it seems to have been placed in a courtyard (although we cannot get a precise idea about its surroundings). In order to protect the grains against insects, rodents, or other agents, the silo was probably roofed (with reeds, wood, dung, or clay) or sealed with stones (Currid and

Navon 1989, 68, 70). The capacity of the silo is estimated to about 11–12 m³.

2.2. Room L.2890

In the large room L.2890, opening on the monumental stairway L.2877 and equipped with eight hearths placed beneath a high bench built against the eastern wall (Mazzoni 1993, 400), a total of 145 samples/subsamples were collected. The archaeological contexts include sediment layers above the floor and the content of several large broken jars,¹⁰ the fragments of which were found above the bench as well as inside and in front of the hearths. The soil from above, around, and just below the fragments of the jars was sampled. Samples from inside the hearths were also taken. Forty-two samples are discussed here and the results are presented in Table 23.2. All the samples have a similar composition. Only sparse remains of food plants (cereals and pulses) are mixed with substantial numbers of charred wild/weed taxa, mainly small-seeded *Leguminosae*, wood charcoal, and well-preserved reed fragments (*Cannaceae*). Scattered finds of cereal rachis remains (chaff) occur. Only 2 pips of *Vitis vinifera* were found, whereas *Olea europaea* is steadily represented in many samples, although in low numbers (42 stones in total).

2.2.1. Samples and Contexts

All the samples related to jars or hearths were grouped together according to their location inside the room (see Table 23.4). Samples taken from all over room L.2890 (from the occupational layer above the floor) are grouped separately.

Hearth 1

Three samples from hearth 1 have been examined so far: TM.89.G./, sample 50/40 (inside the hearth); TM.89.G./, sample 50/9 (under a jar); and TM.89.G./, sample 50/99 (inside the hearth). They were related to the content of the jar TM.89.G.393 (which was collapsed inside) and yielded a fairly great number of wild seeds, mainly small-seeded *Leguminosae* (66 thus far, but analyses are still ongoing), and 2 stones of *Olea europaea* as well as 6 grains of *Hordeum vulgare* and 1 cereal chaff not better identified

(interpreted as an occasional contaminant). Furthermore, 1 seed of *Anthemis/Matricaria*, 1 of *Euphorbia*, 1 of *Trifolium/Melilotus*, 1 of *Scorpiurus muricatus*, and 3 of *Medicago* were found.

Hearth 2

The four samples from hearth 2—TM.89.G.394/1, samples 50/88-A, 50/88-B, 50/88-C, and 50/88-D—come from the jar TM.89.G.394/1. Also in this case the wild seeds predominate, especially small-seeded legumes. Attested plants also include *Crataegus* (2), *Olea europaea* (3), and *Cerealía* indet. (2).

Hearth 3

Two samples (TM.89.G./, samples 50/79-A and 50/79-B [inside the hearth]) related to the jar TM.89.G.395/1 were analyzed. So far 4 grains of *Cerealía* indet., 2 stones of *Olea europaea*, 6 seeds of *Euphorbia*, and 6 of wild plants (unidentified) have been recognized.

Hearth 4

Compared to the other hearths, a smaller quantity of jar fragments were found inside and around hearth 4. Until now, only one sample (TM.89.G./, sample 50/68 [inside the hearth]) has been analyzed, which yielded 1 single grain of *Hordeum vulgare*.

Hearth 5

Four jars (TM.89.G.384/1, TM.89.G.397/1, TM.89.G.383/1, and TM.89.G.396/1) were related to hearth 5.¹¹ Five samples (TM.89.G.384/1, sample 50/43 [inside the hearth under the jar]; TM.89.G.397/1+G.383/1, samples 50/51, 50/71-A [inside the hearth], and 50/65 [in front of the hearth]; TM.89.G.396/1, sample 50/72 [near the jar]) have been examined; they yielded only few grains of cereals (*Hordeum vulgare*, *Triticum dicoccum*), 3 stones of *Olea europaea*, 1 small-seeded *Leguminosae* (*Coronilla*), and 1 seed of *Thymelaea*. The latter two samples contained about forty-two seeds of *Euphorbia*. The samples taken from beneath the jar TM.89.G.397/1 (TM.89.G.397/1, North 1, sample 50/49;

TM.89.G.397/1, South 2, samples 50/77-A and 50/77-B) yielded a fairly great number of *Euphorbia* seeds, namely 126 specimens, 2 seeds of *Rubus*, and 2 stones of *Olea europaea*.

Hearth 6

The two samples analyzed so far—TM.89.G./, sample 50/35 (inside the hearth); TM.89.G.397/1, sample 50/41 (inside the hearth, under a jar)—derive from the inside of hearth 6, where fragments of the jar TM.89.G.397/1 were found. Both were very poor in seeds (2 stones of *Olea europaea* and 1 unidentified seed). Other two samples (TM.89.G.397/1, samples 50/45-A and 50/59, both under the jar) taken from the soil in front of hearth 6 were also related to the jar TM.89.G.397/1. They yielded a significant number of seeds of *Euphorbia* (30), a few cereal grains (1 of *Hordeum vulgare*, 2 of *Cerealía* indet.), 1 stone of *Olea europaea*, and a few small-seeded *Leguminosae* as well as seeds of *Papilionaceae* (pea family).

Hearth 7

The two jars TM.89.G.391/1 and TM.89.G.398/1 were related to hearth 7. Three of the samples analyzed so far—TM.89.G.391, sample 50/36 (inside the hearth), TM.89.G./, sample 50/44 (in front of hearth, under a jar), and TM.89.G.398/1, sample 50/70 (inside the hearth)—have been taken from inside the hearth under the jars. These samples were very poor in seeds: only 12 stones of *Olea europaea*, 1 grain of an unidentified cereal, and 2 unidentified seeds were found. One additional sample related to this jar (TM.89.G.398/1, sample 50/67; the sample comes from beneath the jar) yielded only 1 grain of an unidentified cereal. The jar was placed in front of hearths 7 and 8.

Hearth 8

Fragments of jar TM.89.G.398/1 were also found in front of hearth 8. The only sample examined until now—TM.89.G.398/1, sample 50/64 (in front of the hearth, near the northern wall)—yielded 1 grain of *Hordeum vulgare* and 1 of an unidentified cereal as well as 1 unidentified seed.

Between L.2834 and L.2890

Five samples taken from the inside of the jar TM.89.G.388/1, situated between L.2834 (an anteroom of L.2890) and L.2890, have been analyzed so far. These samples (TM.89.G.388/1, samples 50/38-A, 50/38-B, and 50/91-A [inside the jar] and samples 50/39-A and 50/39-B [bottom of the jar]) contained 12 grains of cereals (4 of *Hordeum vulgare*, 1 of *Triticum* sp.,¹² 7 of *Cerealía* indet.), 18 seeds of *Leguminosae* indet., 15 stones of *Olea europaea*, 1 pip of *Vitis vinifera*, 2 small-seeded *Leguminosae* (*Coronilla*, *Medicago*), 1 unidentified grass seed, and 9 seeds of *Euphorbia*.

Sediment layer above the floor of room L.2890

Until now six samples from the occupational layer above the floor have been examined. They yielded 2 grains of *Hordeum vulgare*, 5 of *Cerealía* indet., 1 seed of *Lens culinaris*, 1 pip of *Vitis vinifera*, 1 seed of *Galium*, 5 unidentified seeds, and 7 *Euphorbia* seeds.

2.2.2. The Archaeobotanical Data from Room L.2890: An Attempt at Interpretation

If room L.2890 was used for cooking or baking activities, as its architecture and equipment might suggest, it is surprising that so few cereal remains or other crop plants have been found in it. One would expect a great number of charred food remains, because in general, due to cooking, casual carbonized cereals and pulses are found in and around hearths or ovens. Moreover, faunal remains, which could be an indicator that food was prepared there, were not found either.

Why so few food plants and so many wild species? The sparse remains of food plants cannot be due to limited sampling (as more than fifty contexts were sampled separately) or to insufficient volume of soil (1,075 liters). In order to answer this question, we should first consider the following points:

1. If the hearths belonged to a kitchen, we should infer that they were cleaned daily, after each cooking, which would be highly unusual. It seems extremely unlikely that all

eight hearths would have been in a cleaned status at the same time. One or more of them should have been in use and not cleaned.

2. Although the jars do not seem to be storage vessels for grains, but rather pots for cooking or boiling, a possible use of them for storage is not completely out of the question (Mazzoni 1993, 407). However, due to the rarity of food plants in comparison with the amount of soil (cereals and pulses were 86 seeds per 1,000 liters; cereals, pulses, plus olives and grapes were 127 seeds per 1,000 liters), the latter use seems unlikely. Wild species were instead present with 327 seeds per 1,000 liters, which means a ratio of approximately 3:1 between wild species and crop plants.
3. It is improbable that high temperatures in the hearths caused a total destruction of the food plant remains, since many small wild seeds have survived. The fact that there are so few remains of food plants must have another explanation, one that is related to the function of the room itself.

There are several possible explanations for the preponderance of the wild species in the samples:

1. One explanation is that small-seeded *Leguminosae* and weeds were removed by fine sieving just before preparing food. Many wild seeds are smaller than grains of barley or wheat, and they could have been passed through the sieve and then thrown into the fire. But such an explanation is unconvincing, since no crop plants and other by-products were found. The few cereal chaff remains can be interpreted as an accidental mixing, and there is no clear evidence of other activities such as crop processing. As the analyses revealed, practically no food plants were used in this room. Therefore, it is also improbable that weedy species associated with the harvested crops were brought inside.
2. Another possibility is that the wild seeds were brought into the room with dung, which was used as fuel for the hearths (Miller 1984, 45–67). Most of the weedy

seeds in the assemblages of room L.2890 are from open vegetation, which is grazed by herbivores. Some seeds pass through the digestive tract undamaged and the burning of the dung may cause the carbonization of the seeds contained in it. But this explanation is also not very convincing, both because some of the seeds that have been found are normally avoided by animals and because the hearths were heated mainly with wood and probably in part with reed, as suggested by the large amount of charcoal and charred reed found.

3. It could be that the room was an open courtyard or working place with a firing installation for working outside. In this case the wild seeds could have been brought in by wind and rain. Another fact that might support this hypothesis is that eight hearths may develop a very high emission of heat and smoke, though it seems logical that this room was not roofed or only partially roofed. In the samples, many fragments of stems were found, having a diameter of 5–10 mm, so that they can be identified as reed rather than straw, the latter having a diameter of 3–5 mm. Thus it could be that the room was roofed in part with reed. One fact speaks against this possibility, however: the wild seeds were mainly found in higher concentrations in samples directly related to the content of the jars and hearths, and not in the samples that were taken from the occupational layers above the floor in several places within the room. A more homogeneous dispersion all over the room should be expected if the room was not roofed and the seeds were introduced by wind or rain. Besides the possibility that reed was used as fuel, the existence of a roof made of reed is very plausible, especially if we consider the working situation and the climate. Another possibility is that there were mats made of reed lying on the floor. The reed may have been harvested on a nearby river.
4. Wild plants were intentionally collected and brought into this particular place.

Among the botanical assemblages of room L.2890, several reed-like curved fragments were found. They might be the remains of baskets that were used to transport the collected plants into the room. As a matter of fact, ancient communities collected wild plants for different purposes. Instead of denominating them as weeds in a negative sense, it is worth looking for other useful applications. Many species were collected for consumption or for medicinal use. Indeed, all the wild species found until now in room L.2890 have potential for use as herbal medicine.

The finding of a large amount of seeds of *Euphorbia* (spurge) inside a jar is remarkable.¹³ The plant exudes a bitter, milky juice when broken, and is therefore avoided by animals (so it could not have been brought in with dung). It is known for its cathartic and especially purgative properties (Craker and Simon 1986, 290). The milky juice is poisonous and thus is used in small doses. *Euphorbia* seeds do also occur in higher numbers in many other samples from several jars. Another medicinal plant is the *Trifolium/Melilotus*, which could be used as a blood thinner, since it contains coumarin, which has anticoagulant properties and helps against bruises, contusions, and sprains (Wichtl 2009, 432). *Crataegus* is known as an effective remedy for heart diseases, problems of blood circulation, and high blood pressure (ibidem, 200). *Galium* can be used as a diuretic and for dermatologic problems (ibidem, 293). *Heliotropium* is effective against poisonous bits and is used locally for headache and internally for lactation (al-Douri and al-Essa 2010, 106). *Coronilla* is applied for diuretic purposes and as a cardiac tonic (ibidem, 103). *Scorpiurus muricatus* is used as a remedy against respiratory disturbances (González-Tejero et al. 2008, 348). *Anthemis/Matricaria* (camomille) is useful against stomach/abdominal cramps, coughs, inflammations in the mouth or throat, and eczema (Wichtl 2009, 331). *Medicago* is known to have effects on the central nervous and cardiovascular systems (Kundan and Anupam 2011, 211).¹⁴ Plants of the genus *Rubus*, which includes species such

as blackberries and raspberries, are well known for the medicinal properties of their fruits and leaves: the berries are considered to be a blood-building tonic, the leaves help against diarrhea, reduce inflammation, cool fever, and strengthen the function of the gall bladder; locally applied, the leaves also treat skin wounds (Wichtl 2009, 576–77). Additional medicinal plants are the *Papilionaceae*, which help against food poisoning and lung diseases and heal open wounds (Craker and Simon 1986, 324), and the *Thymelaeae*, which is used for snake bites and disturbances of the respiratory system (ibidem, 325). The exploitation of medicinal plants in Ebla is confirmed by an ancient pharmaceutical text from the Eblaite archives, in which three categories of diseases are dealt with: “gall bladder diseases (jaundice, biliary insufficiency), gastroenteric system diseases (inflammations, and perhaps faecal incontinence), skin complaints (swelling, eruptions, ulcers, small wounds)” (Fronzaroli 1998, 235).¹⁵

Three additional medicinal herbs are mentioned in this text: hound’s tongue (*Cynoglossum officinale*), plantain (*Plantago*), and aloe (ibidem, 236).

Finally, it should be noted that besides seeds, also other, less preservable parts of plants such as leaves, flowers, and roots were used. The Ebla assemblages confirm this: many small stems of plants were indeed found. To prepare infusions or tisanes for consumption various parts of plants were cooked in water, crushed, or boiled in olive oil to a concentrated extract. This might be confirmed by the fact that some of the jars are covered inside with a sticky resinous crust, which could be an indicator that these jars were used for boiling liquids and/or producing medical substances. In the Ebla pharmaceutical tablet it is mentioned that in the preparation of these mixtures, honey was added to give consistency for the production of pills (ibidem, 238). The incrustations inside the jars could be an explanation for this practice, but chemical analysis will be necessary to gain further knowledge on this detail.

In summary, it is very likely that the hearths of room L.2890 were used to boil liquids rather than for cooking or baking activities, due to the lack of crop plants in the finds from this place. In all likelihood, the seeds were collected for their medicinal properties, and the room was used for the production of medical substances like drugs or ointments. Finally, the close vicinity of L.2890 to the royal rooms emphasizes the importance of this room and of the activities that took place there.

2.3. Other Rooms of Royal Palace G

L.4448

Altogether 121 seeds were recovered from two samples related to different types of contexts collected in room L.4448. One sample was taken from the soil under a broken jar (TM.88.G.378/1, sample 1); it contained a smaller amount of seeds (*Hordeum vulgare*: 20; *Triticum monococcum*: 1; *Cerealia* indet.: 7; *Lens culinaris*: 3; *Olea europaea*: 3; wild plant taxa [*Bromus*, *Galium*, *Hippocrepis*, *Thymelaea*]: 10). The second sample (TM.88.G.380, sample 2) was taken from the occupational layer above the floor near the northern wall M.4447; most of the seeds here are cereal grains, although lentils, olives, and wild seeds are also represented (*Hordeum vulgare*: 14; *Triticum dicoccum*: 1; *Triticum monococcum*: 7; *Triticum dicoccum/monococcum*: 4; *Cerealia* indet.: 31; *Lens culinaris*: 2; *Olea europaea*: 14; wild taxa: 2). It is very likely that the jar was used to store cereals, and that pulses and wild taxa are contaminants.

L.4434

One sample (TM.88.G.289–290, sample 3) was collected from the soil above the floor in room L.4434; it mainly consists of cereal grains (*Hordeum vulgare*: 12; *Triticum dicoccum*: 1; *Triticum monococcum*: 1; *Triticum dicoccum/monococcum*: 3). In addition, 2 single seeds of *Lens culinaris* and *Pisum* as well as 16 stones of *Olea europaea* were recorded. Wild taxa are represented by only 1 seed of *Galium* cf. *tricornae* and 3 unidentified seeds. This context could be

interpreted as an accumulation of household waste or residues from working places nearby.

L.4444

Two samples (TM.88.G.320, sample 4, and TM.88.G.334/1, sample 80) were the content of a jar (TM.88.G.334/1) found in this room. In these samples, 61 seeds were recovered in total (*Hordeum vulgare*: 23; *Triticum monococcum*: 1; *Secale cereale*: 1; *Cerealía* indet.: 17; *Lens culinaris*: 1; *Leguminosae* indet.: 1; *Olea europaea*: 2; wild taxa: 11). The jar was probably used to store cereals.

L.4446

One sample (TM.88.G.315, sample 81) was obtained from a vessel located in the northwestern corner of room L.4446; it contained 3 seeds (*Hordeum vulgare*: 2; *Olea europaea*: 1), which may not belong to the vessel content but rather derive from the collapsed deposit around.

L.4438

One sample (TM.88.G.305, sample 47) was collected from a destruction level in room L.4438. Here 9 seeds were found (*Hordeum vulgare*: 3; *Triticum* sp.: 1; *Cerealía* indet.: 3; *Lens culinaris*: 2). These plant remains could be residues from a working place nearby or result from the accumulation of household disposal, in which the seeds were included occasionally.

L.4436

Two samples (TM.88.G.309, samples 26 and 29) were taken from a drain in the floor of room L.4436. Here 3 grains of *Hordeum vulgare*, 6 of *Cerealía* indet., 6 stones of *Olea europaea*, and 6 wild seeds (*Coronilla*, *Galium*, *Hippocrepis*, *Lolium*) were found. These botanical remains might have been accumulated near the drain after some activity in the room or nearby, and then swept into it.

L.4424

One sample (TM.88.G.298, sample 49) was the content of a small basalt table (TM.88.G.298); it contained 12 seeds (*Hordeum vulgare*: 2; *Triticum monococcum*: 2; *Cerealía* indet.: 4;

Olea europaea: 4). It is difficult to say whether the table was used for ritual practices (offerings) or as a small working-place to process seeds, or whether the seeds derived from the general fill in the room. The mixed assemblage of food plants and the absence of wild taxa may support the first hypothesis.

L.4422

One sample (TM.88.G.280/1, sample 50) was the content of a jar (TM.88.G.280/1). Here 9 seeds were found (*Hordeum vulgare*: 3; *Triticum* cf. *monococcum*: 1; *Cerealía* indet.: 1; unidentified seeds: 4). Due to the scarcity of the botanical residues, it is difficult to say if the jar was used to store grains.

L.4420

Seven samples were taken from room L.4420, which is the largest room in this quarter of the palace. The composition of the samples is very similar; the total amount of seeds is 55. Four samples (TM.88.G.280, sample 21; TM.88.G.273, sample 22; TM.88.G./, sample 39; TM.88.G.306, sample 42) were taken from small pits in the floor of the room. They contained mainly cereals (*Hordeum vulgare*: 15; *Triticum monococcum*: 2; *Triticum* sp.: 5; *Cerealía* indet.: 4), 4 seeds of *Lens culinaris*, 2 stones of *Olea europaea*, and 5 wild taxa (*Galium*, *Lolium*, *Bromus*). Two samples (TM.88.G.260/1, sample 25, and TM.88.G.258, sample 37) come from small jars that were very poor in seeds (*Hordeum vulgare*: 5; *Cerealía* indet.: 4; *Olea europaea*: 8). One sample (TM.88.G.266, sample 36) was taken from the layer above the floor, but it was almost sterile (only one unidentifiable seed was found). The crop plants could be the remains of a working place nearby as well as the result of accumulation or cleaning activities.

L.4452

Two samples were taken in the room L.4452. One sample (TM.88.G.336, sample 79), which comes from a jar (TM.88.G.336) that was sunken into the floor of the room, contained about 2.478 grains of cereals (*Hordeum vulgare*: 707; *Triticum dicoccum*: 71; *Triticum monococcum*:

63; *Triticum aestivum/durum*: 4; *Triticum compactum*: 8; *Triticum* sp.: 50; *Secale cereale*: 2; *Cerealía* indet.: 1,573).¹⁶ The presence of chaff of various kinds of cereals could be the result of an accidental mixing during winnowing. Pulses are also recorded (263), but only *Lens culinaris* occurs in great numbers (*Lens culinaris*: 224; *Cicer arietinum*: 26; *Vicia ervilia*: 1; *Vicia faba*: 3; *Leguminosae* indet.: 9). *Olea europaea* is likewise well attested (158 stones), while *Vitis vinifera* is present with 10 pips and 1 single charred berry. In addition, several wild/weed taxa were found in this assemblage: grasses (*Aegilops*: 5; *Bromus*: 18; *Lolium temulentum*: 161),¹⁷ small-seeded Leguminosae (*Astragalus*, *Hippocrepis*, *Coronilla*, *Trifolium/Melilotus*), *Papilionaceae*, *Galium* (69), *Malva* (2), *Lithospermum* cf. *arvense* (1), and unidentified seeds (25). Finally, some unexpected types, such as linseed/flax (*Linum usitatissimum*), with 3 seeds and 1 capsule, and *Coriandrum sativum* (1 seed), also occur. The second sample (TM.88.G.336, sample 85) was taken from the fill of a pit in the pavement nearby the jar. The composition of the assemblage is quite similar to that of the jar mentioned above. The total amount of seeds is 186. Only *Hordeum vulgare* occurs in great numbers with 102 grains; *Triticum monococcum* is recorded with 1 single grain and *Triticum aestivum/durum* with 2 grains. Finally, 16 specimens of *Cerealía* indet., 17 of *Lens culinaris*, 3 of *Vicia* cf. *faba*, 18 of *Olea europaea*, 2 pips of *Vitis vinifera*, and a few wild/weed seeds (*Galium*: 16; unidentified grasses: 6; indet.: 2) complete this assemblage.

A possible use of the jar for the storage of partially cleaned cereals is conceivable, especially if we consider the presence of some crop weeds, which could be the residues of fine sieving. Additional food plants products such as pulses, olives, and grapes were possibly stored together with the cereals. Remarkable is the presence of flax and spices (coriander) in this assemblage. The accumulation of the seeds, mainly of barley, in the pit near the jar might indicate a working place related to the jar, or that the seeds simply fell out of the jar. It might also be supposed that a second storage jar was located here.

To summarize, it should be noted that no chaff remains of cereals were recovered in the rooms mentioned above, except for some remains in the jar of room L.4452, which could be explained as contaminants of already cleaned cereals. The absence of chaff remains in the other rooms could be an indicator that the initial stages of crop processing took place outside of the settlement. It is probable that the rooms of this quarter of the palace were either living rooms or working places for further treatment of already processed crops.

L.4840

One sample (TM.90.G.90/1, sample 139) comes from the occupational layer around two jars (TM.90.G.90/1 and TM.90.G.90/2) above the floor of the room, which was very poor in seeds. Here 1 grain of unidentified wheat (*Triticum* sp.), 7 of *Cerealía* indet., 1 olive stone (*Olea europaea*), and 5 unidentified seeds mixed with small pieces of charcoal were recovered. From this room also come several seals. It is very likely that the seeds derived from the two jars.

L.4846

In the sample taken in room L.4846 (TM.90.G.98, sample 70), a number of seeds of *Hordeum vulgare* (55) as well as several charred rests of food (porridge of cereals or bread) were retrieved. Two additional samples (TM.90.G.122, samples 133 and 134) derived from the content of a jar that was located in the southern area of room L.4846, sunken below the floor level. It contained mainly cereals (*Hordeum vulgare*: 14; *Triticum dicoccum*: 1; *Triticum* sp.: 2; *Cerealía* indet.: 16) mixed with 3 seeds of *Lens culinaris* and 3 stones of *Olea europaea*. The content of the jar derived probably from the accumulated waste from the floor around it, as the jar did not seem to be used for storage.

This sector of Royal Palace G was more likely used as a residential quarter rather than as a working place for kitchen activities. The scarceness of botanical remains, probably due to the fact that the rooms were kept quite clean, appears to support such an interpretation. However, it cannot be excluded that some activities related

to already cleaned cereals took place in one of the rooms.

3. BUILDING P4

A total number of 175 samples/subsamples has been examined thus far, but the analyses are still ongoing, especially as far as the samples collected during the 1991–1994 campaigns are concerned (see Marchetti, in this volume). Samples were taken from sealed destruction layers in ten rooms inside the public Building P4, which dates from EB IVA (Marchetti and Nigro 1995–1996, 9–36). The sequence of the descriptions below follows the circulation system reconstructed by Marchetti and Nigro. The plant remains are generally in a good preservation condition. The results are shown in [Table 23.3](#).

3.1. Samples and Contexts

L.5005

Fifteen samples have been examined until now. They come from different contexts within the room. Four samples (TM.90.P.633/1–3, samples 144, 221, 224, 235) were taken from the soil around and under three jars crushed on the floor. A total number of 254 seeds were found, mainly cereals (*Hordeum vulgare*: 64; *Triticum cf. dicoccum*: 4; *Triticum monococcum*: 9; *Triticum compactum*: 1; *Triticum sp.*: 9; *Cerealia* indet.: 100), but also some pulses (*Lens culinaris*: 2; *Pisum sativum*: 1; *Vicia ervilia*: 1; *Leguminosae* indet.: 4), 1 pip of *Vitis vinifera*, 40 stones of *Olea europaea*, and 1 stone of *Pistacia*.

Three more samples (TM.90.P.647, sample 140; TM.91.P.816/1, samples 172 and 173) were taken from the content of two additional jars. Compared to the jars mentioned above, they were poor in botanical remains. One jar (TM.90.P.647) yielded only 6 seeds (4 unidentified seeds, including unidentified cereals, 1 specimen of *Pisum sativum*, and 1 of *Olea europaea*). The second jar (TM.91.P.816/1), a hole-mouth Kitchen Ware pot, contained 26 seeds (*Hordeum vulgare*: 10; *Cicer arietinum*: 1; *Leguminosae* indet.: 1; *Olea europaea*: 13; *Crataegus*: 1). One further sample was taken from the soil around

this pot TM.91.P.816/1, under a big piece of carbonized wood (TM.91.P.816, sample 197-J); it consisted of 7 seeds (6 of *Hordeum vulgare* and 1 of *Olea europaea*). The recovery of a large amount of charcoal from these samples supports the hypothesis that room L.5005 was a goldsmith's workshop (ibidem, 17). This last mentioned sample, which yielded 6 *Hordeum vulgare* grains and 1 stone of *Olea europaea*, was probably related to the other two samples coming from the same jar. Considering the composition of the plant assemblage and because no cereal chaff remains were found, it might be suggested that specific species were selected and stored in all these jars.

Five samples (TM.90.P.627, samples 123/A, 123/B, and 123/D; TM.90.P.628, samples 103 and 104) were taken from the destruction level. Only a few scattered remains of *Olea europaea*, *Hordeum vulgare*, *Lens culinaris* were found here. One sample taken from the layer above the floor—TM.90.P.819, sample 195-x4—was also poor in seeds: 8 grains of *Hordeum vulgare* and 1 stone of *Olea europaea* were recorded. Another sample (TM.90.P.822, sample 180), which was related to a semicircular installation above the floor, only yielded 1 olive stone. The seeds found in the destruction layer are likely to be regarded as intrusive materials: after the collapse of the jars, their content was mixed up with the floor layer. The considerable amount of food plants found in the jars may represent the personal storage of the owner of the room.

L.5009

Five samples (TM.90.P.644, sample 127; TM.90.P./, samples 222, 227, 232, and 236) from room L.5009 have been examined until now. They were related to the content of four jars. The total amount of seeds is 58. Four samples (TM.90.P./, samples 222, 227, 232, and 236) were taken from three jars (TM.90.P.651/1, 2, 3) found in the middle of the room, which could be an ancillary room of the goldsmith's workshop (ibidem, 17). They contained cereals (*Hordeum vulgare*: 11; *Triticum cf. dicoccum*: 3; *Triticum sp.*: 2; unidentified cereals: 15) as well as pulses (*Lens culinaris*: 1, *Pisum sativum*: 2), and 9 stones of *Olea europaea*, to which 1 berry of *Vitis vinifera* as

well as a few wild seeds are to be added. Another jar (TM.90.P.644, sample 127) contained only 2 seeds of *Hordeum vulgare*, 2 of *Triticum* sp., and 6 *Cerealia* indet. It is difficult to say whether these seeds come from storage jars or from the general fill around the jars. We may note, however, that both the context and the botanical assemblage are very similar to those of room L.5005, which did contain storage jars.

L.5032

Fourteen samples (TM.90.P.1051, samples 183/H-x5, 194/A, 194/B; TM.90.P./, samples 195, 209, 212, 214, 216, 229, 230, 230/A, 233, 241, 247) were taken from a small room that communicates directly with rooms L.5005 and L.5009 (ibidem, 17). Altogether 200 liters of soil were floated, in which a total number of 85 seeds occurred. The samples are derived from the content of numerous jars found in this room. The plant assemblage is very similar to that of the other jars found in rooms L.5005 and L.5009. In this room, however, the main botanical remains are stones of *Olea europaea* (35), followed by 30 cereal grains (*Hordeum vulgare*: 9; *Triticum dicoccum*: 1; *Triticum monococcum*: 1; *Triticum* sp.: 1; *Cerealia* indet.: 18). Pulses are also recorded with 4 seeds (*Lens culinaris*, *Pisum sativum*, *Vicia faba*, *Leguminosae* indet.). *Vitis vinifera* occurs with 2 pips; *Galium*, a common weed, with 3 seeds; and there are some unidentified specimens.

L.5035

One sample (TM.90.P.1033, sample 196) from room L.5035 has been examined. It comes from the layer above the floor, in which 20 seeds were found. Several grains of cereals (*Hordeum vulgare*: 2; *Cerealia* indet.: 3), 3 seeds of pulses (*Cicer arietinum*, *Lens culinaris*, *Vicia faba*), 6 stones of *Olea europaea*, 1 pip of *Vitis vinifera*, and a few wild taxa are recorded.

L.5007

Nine samples (TM.90.P.1029, sample 147; TM.90.P.1004, sample 178; TM.90.P.1061/A, sample 228; TM.91.P.702, sample 8; TM.90.P.707, sample 11/A-y1; TM.90.P.709, sample 64/C; TM.90.P.1016, samples

130/E/F/H) were taken from room L.5007, and a total of 119 seeds were recovered. Two samples (TM.90.P.1029, sample 147, and TM.90.P.1004, sample 178) come from the layer above the pavement. Both contained few stones of *Olea europaea* (5). Four samples were related to jars. One sample (TM.90.P.1061/A, sample 228) derived from a tripod jar in which 2 grains of *Cerealia* indet., 3 stones of *Olea europaea*, and 1 pip of *Vitis vinifera* were found. In another jar a sample containing 33 seeds was recovered (TM.91.P.702, sample 8): 9 grains of *Hordeum vulgare*, 1 of unidentified *Triticum*, 14 of *Cerealia* indet., 2 pips of *Vitis vinifera*, 3 stones of *Olea europaea*, 3 seeds of *Lens culinaris*, and 1 of *Galium*. In three samples taken from the floor layer (TM.90.P.1016, samples 130/E/F/H) 55 seeds were found: 31 of cereals (*Hordeum vulgare*: 10; *Triticum* sp.: 1; *Cerealia* indet.: 20), 6 of *Lens culinaris*, 7 of *Olea europaea*, and 1 of *Vitis vinifera*. Two additional samples (TM.91.P.709, samples 11/A-y1 and 64/C) were found in another jar, from which 20 seeds were recovered: 5 of *Hordeum vulgare*, 5 of *Cerealia* indet., 1 of *Pisum* cf. *sativum*, and 9 of *Olea europaea*.

L.5021

A total of 122 seeds were recovered from twelve samples taken in room L.5021. Nine samples (TM.90.P.660, samples 163/x5 and 164/x5; TM.90.P.1034, sample 188; TM.90.P.1029, sample 189; TM.90.P.1068, samples 218 and 238 [the latter from near the small jar TM.90.P.1068/A]; TM.90.P., sample 239; TM.91.P.805, samples 105 and 103/x1) come from the soil above the floor. They contained some cereals (*Hordeum vulgare*: 10; *Triticum monococcum*: 2; *Triticum compactum*: 1; *Triticum* sp.: 2; *Secale cereale*: 5; *Cerealia* indet.: 49), 3 seeds of *Lens culinaris*, 2 pips of *Vitis vinifera*, and 41 stones of *Olea europaea*. From a large jar 1 single seed of pulses (indet.) was retrieved (TM.91.P.805/1, sample 205; ibidem, 27, fig. 6; Matthiae, Pinnock, and Scandone Matthiae 1995, 378, fig. 210). Finally, a few seeds were found in two hole-mouth Kitchen Ware pots that had been buried under the floor in the northeastern corner of the room and reused as

pot burials for infants (TM.91.P.853/1, sample 208, and TM.91.P.853/2, sample 203). While sample 203 was very poor in seeds, with only 1 grain of an unidentifiable cereal type, sample 208 yielded a few more grains (*Hordeum vulgare*: 2; *Pisum sativum*: 1; *Olea europaea*: 2).

L.5038

Two samples (TM.90.P.1065, sample 186; TM.90.P.1067, sample 198 [from a jar with grooved rim]) were taken from room L.5038. In total 52 seeds were recovered. One sample comes from the layer above the floor, which contained 6 grains of *Hordeum vulgare*, 26 of *Cerealina* indet., 1 seed of *Lens culinaris*, and 18 of *Olea europaea*. The second sample comes from a jar in which 1 single stone of *Olea europaea* was recorded.

L.5214

Six samples (TM.91.P.787, samples 131/E and 131/H; TM.91.P.792, sample 162/x5; TM.91.P.787, sample 174/J; TM.91.P.797; samples 164/E and 112/D-E-G) were found in the layer above the floor in room L.5214. A total amount of 86 seeds were counted. Cereals are represented with 60 grains (*Hordeum vulgare*: 28; *Triticum* sp.: 6; *Cerealina* indet.: 26). One seed of *Lens culinaris* and 25 stones of *Olea europaea* are also attested.

L.5216

One sample (TM.91.801, sample 102/y2) has been taken from this small room, near L.5214. A total number of 54 seeds were found. Here 18 *Hordeum vulgare* grains, 2 seeds of *Lens culinaris*, 1 of an unidentified pulse, and 33 stones of *Olea europaea* were retrieved.

L.5220

Thirteen samples (TM.91.P.786, sample 175/x5; TM.91.P.795, samples 167/y1-A and 170/y1-A; TM.91.P.779, samples 166/E-H and 144/y2-D; TM.91.P.784/1, sample 126; TM.91.P.804, sample 189/G-D; TM.91.P.770/1, sample 90/A [from a small spouted jar]; TM.91.P.803, samples 101/y3 and 101/y1; TM.91.P.768/4, sample 184; TM.91.P.777/5, sample 163/H;

TM.91.P.781/1, sample 188/y2-D) were taken from room L.5220. Altogether 129 seeds were found. Ten samples concerned the layer above the floor. They yielded 48 grains of cereals (*Hordeum vulgare*: 33; *Triticum dicoccum*: 3; *Secale cereale*: 2; *Cerealina* indet.: 16). Pulses (*Lens culinaris*: 2; *Pisum sativum*: 1; *Leguminosae* indet.: 1), *Olea europaea* (15), and *Vitis vinifera* (1 pip) are also represented. Two samples were taken from a little hole in the floor (TM.91.P.770/1, sample 101/y3, and TM.91.P.803, sample 101/y1). Here 31 grains of *Hordeum vulgare*, 1 seed of *Lens culinaris*, 7 stones of *Olea europaea*, and 3 pips of *Vitis vinifera* were found, which might have fallen into the hole during the cleaning of the floor. Three samples (TM.91.P.770/1, sample 90/A; TM.91.P.777/5, sample 163/H; and TM.91.P.781/1, sample 188/y2-D) were taken from the content of three jars that turned out to be poor in seeds (*Hordeum vulgare*: 3; *Triticum* sp.: 2; *Cerealina* indet.: 4; *Olea europaea*: 3).

3.2. Botanical Assemblages from Building P4: An Attempt at Interpretation

Building P4 has been amply sampled for archaeobotanical studies. The EB IVA samples were recovered from several jars and floor layers associated with the functional structures inside the rooms. Six analytical questions concerning the samples from Building P4 are addressed here from an archaeobotanical point of view:

Which kinds of plants were found in this building?

Can their original spatial distribution inside the rooms be established?

What are the proportions of the various species?

Is it possible to identify the past function of the excavated structures?

What information can be obtained about crop processing and consumption activities?

Is there evidence of storage?

The vegetable material recovered in the samples is of mixed origin, representing the outcome

of various human activities such as storage, preparation, and consumption. Nearly all of the seeds found in the assemblages are edible. The composition of the plant assemblages in all the rooms of Building P is almost similar: barley and olives are ubiquitous, mixed with some seeds of pulses and grapes. Single grains of hulled and naked wheat were also recovered: emmer (*Triticum dicoccum*) and einkorn (*Triticum monococcum*), as well as the free-threshing bread/hard wheat (*Triticum aestivum/durum*). One additional cereal, rye (*Secale cereale*), is also attested.

It is noteworthy that almost no seeds of weeds and absolutely no threshing remains are present. This absence could indicate that the cereal crop had been carefully cleaned after harvesting and threshing outside of the settlement, and then brought into the building for storage or food preparation, as the numerous jars and the grinding and pounding stones found on benches indicate (Marchetti and Nigro 1995–1996, 17). Concerning the storage of cereals, it is less probable that large supplies of grains were stored, since no pure cereal sample was found and the vessels in the rooms are relatively small. It is more likely that the presence of the grains was related to some processing activities. But if cereals were regularly processed in these rooms, one should expect more chaff remains and weedy seeds. As no ovens were found, apparently no cooking or baking activities took place here.

The following overview of the results shows that cereal grains, olives, pulses, vine, nuts, and weeds occurred in various quantities across samples from the different rooms.

I deal with the cereals first because one of the main questions is whether cereals were processed in these rooms, as the many grinding tools and installations seem to indicate. Only in room L.5005 was a large amount of barley (92 grains) as well as a great number of *Cerealina* indet. (probably, mostly barley) found. Wheat species are also represented in this room with 23 grains, with the seeds of *Triticum monococcum* being more numerous than those of *Triticum dicoccum*, while only 1 grain of *Triticum compactum* is attested.

The highest concentration of plant remains in L.5005 was found in connection with four jars. Assuming that the vessels were used for storage, different crops might have been kept separately in the pots. This room, which has been identified as a goldsmith's workshop (see above), does not seem to have been used for large-scale storage but rather for household/workshop storage of small amounts of cleaned cereals, pulses, vine, fruit, and *Pistacia* ready for consumption.

The composition of the botanical assemblage, which includes nuts of *Pistacia* and the fruit of *Crataegus* (hawthorn), clearly indicates that wild fruits were intentionally collected, mixed, and stored together with crops in the jars. It cannot be ascertained, however, whether the fleshy fruits of *Crataegus*, which had to be collected from the wild, were eaten fresh or added to flour. The high density and diversity of the seeds in TM.90.P./, sample 221, compared to other samples from the floor of room L.5005, suggest that this sample does represent the original content of the jars.

Wild pistachio is found in northeastern Iran, in the north of Afghanistan, and in some ex-soviet central Asian republics (Uzbekistan, Turkmenistan, Kazakhstan): thus, the tree could have been brought into cultivation in the Ebla region from there (Zohary, Hopf, and Weiss 2012, 151–52). It is not possible to say whether the nuts of *Pistacia* found in Building P4 were collected from the wild or from a domesticated tree. Nor can we establish to which species the nutshell fragments belong: two species might be considered, *Pistacia atlantica* and *Pistacia palaestina* (two varieties of terebinth). Nevertheless, this find may indicate trade relations with far distant regions, showing that the inhabitants of Ebla were involved in economic exchange also of perishable commodities. The nuts of *Pistacia* could have been regarded as delicacies and used in small quantities as luxury goods. In fact, if *Pistacia* trees were grown locally, we would expect a more abundant presence of *Pistacia* remains in the archaeobotanical record. Both *Pistacia* and *Crataegus* were only found in room L.5005. The archaeological objects and equipment of this room (pieces of inlay, statuettes,

silver and gold fragments, one andiron, one incense burner, one fire container, flint blades) and the lack of grinding tools (Marchetti and Nigro 1995–1996, 16–17) do not point to crop processing activities.

Barley (*Hordeum vulgare*) is also present in all the samples from the other rooms of Building P4, but in smaller quantities. In addition to room L.5005, described above, and room L.5220, in which a larger amount of barley was found (67 grains), barley is present in the other rooms in almost similar numbers, from a minimum of 13 to a maximum of 28 seeds. Three rooms, L.5032, L.5035, and L.5038 contained very small quantities of barley: 2, 6, and 9 grains, respectively. *Triticum dicoccum* occurs only in four rooms: L.5005 (4), L.5009 (3), L.5220 (3), and L.5032 (1); *Triticum monococcum* in three rooms: L.5005 (9), L.5021 (2), and L.5032 (4); *Secale cereale* in two: L.5021 (5) and L.5220 (2).

The question of whether cereals were processed in these rooms is difficult to answer. In all the rooms (except for L.5005 and L.5007), one to four grinding stones, sometimes placed near benches, and several grinding tables were found; only room L.5220 contained a greater number of grinding stones (10). Two rooms, namely L.5032 and L.5035, had round installations such as two pulping and milling platforms, with a hollow in the middle, and a plastered area with a shallow depression. It has been suggested that these installations were used to finely grind cereals, since two grinding stones and tables were found (ibidem, 17). In room L.5032, altogether 30 grains of cereals were recovered, whereas only 5 grains were found in L.5035. It should be noted, however, that by-products of cereal processing were absent. Not a single cereal chaff remain occurs, and crop weeds such as *Galium*, which could have passed the sieve, are very rare in these rooms. The suggested cereal-processing function of these round installations is thus not directly reflected in the samples from the rooms L.5032 and L.5035. However, flour might have mixed with water/oil on the platforms for preparing bread. Another possibility is that olives were

squeezed on the platforms to produce olive oil (see below).

In room L.5009, interpreted as an ancillary room of the goldsmith's workshop L.5005, one grinding stone was recovered as well as three jars and several luxury items (ibidem, 17). As mentioned above the content of the jars is similar to that of the jars found in room L.5005, but less "exquisite." The samples are of the mixed type, cereals and pulses together, but without nuts and fruit such as *Pistacia* and *Crataegus*. These seeds may derive from a single deposit (which could have been in L.5005) and then they may have spread over parts of the adjacent room. In this case the function of the jars in room L.5009 would have been other than storage. A clear indication of cereal processing for L.5009 is not given by the samples.

Room L.5007 is considered to be the main storage room due to its central position and the numerous storage jars found inside (ibidem, 13, 18). As far as the archaeobotanical assemblages are concerned, mainly barley was found (24 grains) and only 2 grains of a wheat type. *Cerealia* indet. (41 grains) might thus be mainly *Hordeum vulgare*. It is possible that the mixture of crops (cereals, pulses, olives, and vine) was the result of several depositional episodes.

Various cereals have been found in room L.5021, although in small quantities. *Hordeum vulgare* is represented with 12 grains, *Triticum monococcum* with 2 grains, and free-threshing wheat (*Triticum compactum*) with 1 single grain. *Triticum dicoccum* is absent. Two grains are attributed to *Triticum* sp.; 50 cereal grains remain unidentified, because they are fragmentary or deformed. Surprisingly enough, *Secale cereale*, rarely attested in the ancient Near East, is also represented with 5 grains. No weed seeds were recovered, which again indicates that only cleaned cereal grains were brought into the room. The low number of items and their mixed composition makes it almost impossible to determine whether these cereals were grown together or as separate crops. The plant remains were recovered from floor samples as well as from samples related to jars (more seeds were found in the floor samples than in the pots).

The equipment of this room includes grinding tools, benches, a plastered area with a raised ridge, a cistern, and a drainage pipe that points to food processing activities for which water was needed (ibidem, 18).

In two rooms, L.5038 and L.5216, only barley was found, with 6 and 18 grains, respectively. Another room, L.5214, yielded barley grains (28) as well as few wheat grains (6). The plant remains in these rooms were mostly recovered from floor samples, which might indicate that they were remains of daily life activities. It is remarkable that in these three rooms again no weed seeds were recovered.

Apart from the goldsmith's workshop, only room L.5220 yielded a discrete amount of cereals: 67 grains of *Hordeum vulgare*, 3 of *Triticum dicoccum*, 2 of *Triticum* sp., 2 of *Secale cereale*, and 20 of *Cerealia* indet. The equipment of this main room of Building P4 consists of numerous grinding tools placed near the benches as well as a tripartite installation and three hollows, probably for storage jars (ibidem, 14–15). Most of the samples were taken from the layer above the floor; three samples were related to jars, which were very poor in seeds (3–6). The composition of the floor samples is of a mixed nature, with cereals and olives being predominant. Only 1 weed seed was found. This might be interpreted as evidence that already processed and hand-sorted cereals in which the last chaff or other contaminants had still to be removed were used or stored in these rooms (see Hillman 1984). The grinding tools might indicate further processing, and the jars could point to storage of products ready for human consumption.

In the archaeological deposits from Building P4, pulses only constitute a small part of the botanical assemblages. In all the samples pulses are mixed with cereals, but are represented by much fewer remains than cereals. Five pulse species are attested: *Lens culinaris*, *Pisum sativum*, *Cicer arietinum*, *Vicia faba*, and *Vicia ervilia*. Lentils are the most frequent species and occur in all rooms, although in very small amounts, from 1 to 3 seeds. Only in room

L.5007 a greater number of seeds was found (9). Peas are attested with certainty in four rooms (L.5005, L.5009, L.5021, and L.5032) in minimal numbers (from 1 to 2 seeds). Two seeds that were recovered from the rooms L.5007 and L.5220 are probably also *Pisum sativum*. Chickpeas occur in two rooms, L.5005 and L.5035, with 1 seed each, and broad beans are attested in rooms L.5032 and L.5035, with 1 seed each. One single seed of bitter vetch is also recorded in room L.5005. These low numbers may be due the fact that pulse seeds were consumed in a green and fresh state, and that they did not need to be cooked. Another possibility is that pulses were ground together with cereals to make flour in order to enrich bread with proteins. It cannot be ascertained, however, whether the identified species of pulses were intentionally cultivated or they only occurred as contaminants in the barley fields. Lentils and peas always occur mixed together with cereals.

Among fruit trees, *Vitis vinifera* has been found in Building P4 in small numbers (from 1 to 4 seeds). Charred pips were found in six rooms (L.5005, L.5007, L.5021, L.5032, L.5035, and L.5220), and one entire berry in room L.5009. The remains were recovered from floor samples as well as from samples related to jars. It is not yet possible to say whether these finds represent accidental admixtures, whether grapes were stored together with other crops, or whether the found pips are simply evidence of direct consumption.

Finally, olives are also well attested in Building P4. Stones of *Olea europaea*, both intact and fragmented, were found in all the rooms in fair amounts (291). The greatest number of olives (69) was recovered from the goldsmith's workshop, L.5005, where 33 three stones were found in the sample from the jar that also yielded the stored cereals, pulses, and *Pistacia* mentioned above. From rooms L.5021, L.5032, L.5038, L.5214, L.5126, and L.5220 come additional discrete amounts of olives (from a minimum of 19 to a maximum of 43 seeds), whereas in two further rooms, L.5009 and L.5035, only 9 and

6 olive stones were found, respectively. Olives were probably the main source of vegetable oil at Ebla. The large number of vessels found in the rooms of Building P4 suggests that olives or olive oil could have been kept there. The round platforms of the rooms L.5032 and L.5035, however, may have been used not only to squeeze olives,¹⁸ but also to process other horticultural products.

The multiple uses of olive oil are well known. Olives are a component of human diet, and olive oil is used not only as a fuel for lamps, in medical remedies, and for the preparation of perfumes or aromatic unguents, but also used in textile manufacturing and in rites and ceremonies. One additional important use is as a fuel to generate the temperatures necessary to smelt metals. The melting temperature of gold is 1064°C, of copper 1084°C, of silver 961°C, and of bronze 800–1100°C, depending on alloy ratios; without an additional inflation of oxygen, wood fire reaches 600°C, charcoal fire 800°C, whereas an oil fed flame produces a temperature of 1200–1400°C. The quality of the oil flame is mainly dependent on the burning equipment and the purity of the oil. Contrary to wood and charcoal, the oil flame is less flickering, needs no additional ventilation, burns constantly for a longer time, and can be focused on a small area, such as the peculiar fire container found in the goldsmith's workshop.

In summary, the plant assemblage from Building P4 includes different crops such as barley, free-threshing wheat, rye, and pulses. Among fruit crops, only vine is attested, and oil fruit is represented by olives. A few species were either collected from the wild (hawthorn species) or may have been imported (*Pistacia*). The scarcity of threshing remains or weed seeds strongly supports the conclusion that cereal grains arrived in Building P4 already in a clean state and were probably stored in small quantities for further processing. The archaeological evidence of the entire complex of Building P4 confirms clearly its multifunctional destination. The grinding

installations and stone implements that were found there could have been used to process agricultural products such as cereals and/or olives. The numerous olive oil storage jars and the various installations for providing and draining water could indicate a small olive oil production, water being needed to separate oil from the olive mash (Charles 1985, 51). Water might also have been used for swelling cereals or pulses before consumption, or added to the flour for making dough.

4. CONCLUSIONS

From our examination of the botanical remains from the EB IVA period of Ebla, a broad spectrum of both crop plants and wild plants emerges. Among cereals, barley constitutes the dominant crop. Among hulled wheats, emmer is predominant, but einkorn is also well attested. Naked wheats were minor crops or occurred as weeds in the cultivated fields. The absence of cereal chaff remains in Building P4 and the low numbers found in Royal Palace G may indicate that the grains were brought almost cleaned into the city from the outside.

Lentil is the main legume crop, followed by peas. Other pulses, such as chickpeas and broad beans, are only rarely attested and appear to have been of minor importance. In addition, olives and grapes seem to have been brought into the settlement from surrounding plantations and vineyards for direct consumption or already processed into olive oil and wine. The only other oil plant recorded is flax.

The presence of *Pistacia*, attested in Ebla by some nuts, is especially noteworthy, being the finds of *Pistacia* species from the Early Bronze Age in Syria very rare.

Differences in the plant spectrum of the cultivars occur not only between the two units examined in Royal Palace G, but also in comparison with Building P4. The proportions of the various species are as shown in [Table 23.1](#).

Until now, it seems that large-scale storage of cereals, together with pulses, olives, and grapes,

AREA/PERCENTAGE	CEREALS	PULSES	OLIVES	TOTAL
Area G	5,193	1,015	488	6,696
% of Area G	77.5	15.2	7.3	100
Area P	637	47	291	973
% of Area P	65.3	4.8	29.9	100

Table 23.1. Proportions of edible species in EB IVA samples from Royal Palace G and Building P4

mostly occurred in Royal Palace G, as the presence of a huge silo and storage jar attest. Similar contexts are not yet known from Building P4. In contrast, it appears that cereals and/or olives were processed and prepared for consumption in the latter building. A small-scale food plant storage for a single household/workshop is attested in one of its rooms. It might be argued that olives were crushed and squeezed on platforms to obtain olive oil, which could have been also used to melt metals.

In Palace G, in addition to food plants, many wild taxa were recovered in the samples. Most of them are common field weeds, which are frequently found in the archaeological sites of the Near East. Plant families found in Ebla include, for example, *Asteraceae*, *Brassicaceae*, *Liliaceae*, small-seeded *Leguminosae*, *Poaceae*, *Rosaceae*, *Malvaceae*, and *Papaveraceae*. Most of these taxa occur rarely and in small numbers, except of *Euphorbia*. The wild seeds are either field weeds, which grow in agricultural soils, or plants of the steppe or desert. Many of them are herbaceous and could be used also as fodder plants.

So far, more than 1,462 wild or weed seeds have been recovered from the Ebla samples. The distribution pattern of wild plants is quite different between the two excavation areas. The concentration of wild seeds in Royal Palace G is much higher than in Building P4. In the storage contexts from Royal Palace G, typical weed taxa occur, which indicate that partially cleaned cereals were stored there. The concentration of several wild plants species, all with medicinal properties, in one room of Royal Palace G may suggest that medical substances or drugs were produced and

kept in large pots in that part of the palace, as an ancient pharmaceutical text from Ebla also suggests. Although the samples from Ebla that have been analyzed so far do not cover the whole EB IVA evidence collected (see note 3), they nonetheless offer a significant glimpse into the full archaeobotanical potential of Ebla.

NOTES

- 1 I would like to express my warmest thanks to Paolo Matthiae, Nicolò Marchetti, and Frances Pinnock, who allowed me to participate in the Ebla Chora Project. Without the support of Michael Peters, Director of the Institut für Vor- und Frühgeschichtliche Archäologie und Provinzialrömische Archäologie of the Ludwig Maximilians University of Munich (LMU), the collaboration between the Sapienza University of Rome and the LMU would not have been possible. Stefania Mazzoni provided me with archaeological information and valuable suggestions; Gianni Marchesi made many stimulating comments; Maria Gabriella Micale, Nicolò Marchetti, and Luca Peyronel helped me to complete the archaeological data relating to the contexts of the samples: to all of them goes my gratitude. Last but not least, I would like to thank Josef Grabmayr, my technical assistant in photography.
- 2 When possible, identifications were made to species. In cases in which the remains were extremely carbonized, seeds are only identified with reference to genus or family (for the abbreviation sp. see note 12). In some cases, however, when the species of a given seed can be guessed in spite of the lack of decisive identification criteria, the notation “genus name + cf. + species indicator” is used (e.g., *Triticum* cf. *monococcum*). As for the pottery bucket associated with the sample, it refers to a specific vessel if the number is followed by the slash symbol (e.g., TM.88.G.378/1). In

case the slash symbol follows directly the area siglum, it means there is no specifically associated bucket (e.g., TM.88.G./). Sample numbering follows my own field recording.

- 3 The results and data presented here are to be regarded as preliminary. There are still hundreds of samples left from the 1987 to 1994 excavations, which will be examined and evaluated during the progress of the Ebla Chora Project (ECP).
- 4 Plant assemblages may also include remnants of edible wild plants such as fruit seeds or nuts, which were sources of food.
- 5 Seven samples have been analyzed until now: TM.90.G., sample 69; TM.90.G.101, samples 89 and 101; TM.90.G.105, samples 90 and 99; TM.90.G.117, sample 111; and TM.90.G.99, sample 141.
- 6 The alternation of ashy soil with more compact layers in S.4843 might be explained with the practice of firing the inside of a storage pit in order to burn cereal grains that could have germinated or spoiled, as has been observed in Iron Age Palestine (Currid and Navon 1989, 75). Other benefits of the smoking process are that the pit is totally dried, the moisture content is held low, vermin and insects are killed, the exposed earth is hardened so that it is less penetrable by worms or rodents, and microorganisms on the pit walls are destroyed.
- 7 Most of the unidentified seeds are probably barley, considering the high percentage of this cereal's grains in the sample.
- 8 Such legumes as *Medicago*, *Trifolium*, *Coronilla*, or *Astragalus* have been grouped together in the category of small-seeded *Leguminosae* (pea family).
- 9 The finds of *Pistacia* are of great importance; cf. §§ 3.2 and 4.
- 10 They are more precisely large Kitchen Ware pots. The term jar is used in a general sense throughout this article.
- 11 TM.89.G.397/1 and TM.89.G.383/1 were located inside hearth 5, whereas TM.89.G.396/1 was found in front of it. Fragments of the jar TM.89.G.397/1 were also found between hearths 5 and 6.
- 12 Note that *Triticum* sp. does not stand for *Triticum spelta*, as was misunderstood in an earlier publication (Archi 1999). It means *Triticum* species and indicates an unidentified species of *Triticum* (see note 2). Spelt is not attested in Ebla.
- 13 It is very probable that the seeds were contained in jar TM.89.G.397/1.
- 14 *Medicago sativa* is a herbal medicine traditionally used in several countries, including Turkey and Iraq.
- 15 Whether these plants also occur in the Ebla assemblages remains to be ascertained by means of further analysis of the still unidentified seeds.
- 16 Most of the unidentified seeds are probably to be attributed to barley, due to its great preponderance.
- 17 *Lolium* (ryegrass), and especially the species *temulentum*, is a well-known contaminant of grain. Its seeds are poisonous (due to the presence of the alkaloid temulin, produced by a fungus that lives symbiotically with the plant), and its poison can affect the nervous system of humans and animals. Since the seeds of *Lolium* have approximately the same size as cereal grains, they have to be separated by hand. Such a high quantity of toxic seeds in the sample examined means that the stored cereals had not been carefully cleaned; it is likely that small amounts of cereals were cleaned more carefully just before food preparation.
- 18 The early method of pressing olives is quite simple and was done by hand. One of the first milling practices was to crush the olives with a stone (for example a grinding slab) on a stone table or in a stone basin. Round installations with an elevated ridge were especially used for olive processing (Dalman 1964, 210).

Archaeobotanical Analyses at Tell Mardikh / Ebla, EB IVA, Royal Palace G															Σ
Archaeological Unit/Context	F.4843	L.4420	L.4422	L.4424	L.4434	L.4436	L.4438	L.4444	L.4446	L.4448	L.4452	L.4840	L.4846	L.2890	
Volume of soil floated (liter)	442,00	26,15	8,50	20,50	9,00	5,50	1,00	15,50	12,00	18,00	62,00	9,00	18,00	215,30	862,45
No. of Samples / Sub-Samples*	98	7	1	1	1	2	1	2	1	2	20	1	2	42	181
TAXA															
CEREALS															
Hordeum vulgare, grains	893	20	3	2	12	5	3	23	2	34	809		69	16	1891
Hordeum vulgare, spikelet forks											4				4
Hordeum spontaneum / distichum, grains	3														3
Triticum dicoccum, grains	75				1					1	71		1	1	150
Triticum cf. dicoccum, grains	13														13
Triticum dicoccum, spikelet forks	1										20				21
Triticum monococcum, grains	71	2		2	1			1		8	64				149
Triticum cf. monococcum, grains			1												1
Triticum monococcum, spikelet forks											15				15
Triticum monoc. / dicoc., grains					3					4					7
Triticum aestivum / durum, grains	5										6				11
Triticum compactum, grains											8				8
Triticum sp., grains	84	5					1	4			50	1	2		147
Secale cereale, grains								1							3
Cerealia indet., grain fragments	1054	8	1	4	40	6	3	17		38	1589	7	16	27	2810
Cerealia indet. chaff	9													2	11
PULSES															
Cicer arietinum	2										26				28
Lens culinaris	400	4			1		2	1		5	241		3	1	658
Pisum sativum	162														162
cf. Pisum sativum	4				1										5
Vicia ervilia	2										1				3
Vicia faba	4										3				7
cf. Vicia faba	2										3				5
Leguminosae indet.	90				1			1		2	10			43	147
OIL FRUIT															
Olea europaea	210	10		4	16	6		2	1	17	176	1	3	42	488
FRUIT															
Vitis vinifera, pips, charred	34										12			2	48
Vitis vinifera, berry	0										1				1
Vitis vinifera, stalks	1														1
Vitis cf. vinifera, fragments	21														21
Punica granatum	1														1
WILD															
Aegilops sp., grains											5				5
Anthemis / Matricaria sp.	2													1	3
Astragalus sp.								1			1				2
Avena cf. fatua	1														1
Bromus sp.		1									1	18			20
Calystegia sp.	1														1
cf. Carduus sp.	1														1
Cephalaria syriaca	1														1
Chenopodium sp.	1														1
Coriandrum sativum											1				1
Coronilla sp.						2					2			2	6
Crataegus sp.	3													2	5
Euphorbia sp.														221	221
Galium sp.	66	2				1		5		4	85			1	164
Galium cf. tricornis					1										1
Gramineae indet.	63										6			1	70
Heliotropium sp.	1													2	3
Hippocrepis sp.	8					1				3	14			1	27
Lathyrus sativus	4														4
cf. Lathyrus sativus	2														2
Liliaceae indet.	1														1
Linum usitatissimum, capsule	1										1				2
Linum usitatissimum, seed											3				3
Lithospermum arvense	1														1
Lithospermum cf. arvense											1				1
Lolium temulentum	1										161				162
Lolium sp.	1	2				2									5
Malva sp.	43										2				45
Medicago sp.	5													7	12
Medicago radiata	1														1
Papilionaceae indet.	6										11			2	19
Pistacia sp.	5														5
Pistacia atlantica/palaestina	1														1
Ranunculus arvensis	1														1
Rubus sp.	2													2	4
Salsola sp.	3														3
Scorpiurus muricatus	1													1	2
Sherardia arvensis	4														4
Thymelaea sp.										1					2
Trifolium / Melilotus sp.											1			1	2
Indet.	504	1	4		3			5		3	27	5	6	98	656
Total	3867	55	9	12	80	23	9	61	3	121	3450	14	55	460	8219

Table 23.2. Archaeobotanical analyses from Area G (S.4843 EB IIIB, the rest EB IVA). *) Note: because of the huge amount of soil or other archaeological reasons, some samples have been divided into sub-samples.

Archaeobotanical Analyses at Tell Mardikh / Ebla, EB IVA, Building P4											Σ
Archaeological Unit / Context	L.5005	L.5007	L.5009	L.5021	L.5032	L.5035	L.5038	L.5214	L.5216	L.5220	
Volume of soil floated (liter)	105,00	75,00	113,00	86,50	205,00	21,00	71,00	45,70	10,00	22,00	754,20
No. of Samples / Sub-Samples*	30	18	19	22	43	4	14	6	1	18	175
TAXA											
CEREALS											
<i>Hordeum vulgare</i> , grains	92	24	13	12	9	2	6	28	18	67	271
<i>Triticum dicoccum</i> , grains					1					3	4
<i>Triticum cf. dicoccum</i> , grains	4		3								7
<i>Triticum monococcum</i> , grains	9			2	1						12
<i>Triticum compactum</i> , grains	1			1							2
<i>Triticum sp.</i> , grains	9	2	4	2	1			6		2	26
<i>Secale cereale</i> , grains				5						2	7
<i>Cerealia</i> indet., grain fragments	109	41	15	50	18	3	26	26		20	308
PULSES											
<i>Cicer arietinum</i>	1					1					2
<i>Lens culinaris</i>	3	9	1	3	1	1	1	1	2	3	25
<i>Pisum sativum</i>	2		2	1	1						6
cf. <i>Pisum sativum</i>		1								1	2
<i>Vicia ervilia</i>	1										1
<i>Vicia faba</i>					1	1					2
<i>Leguminosae</i> indet.	5			1	1				1	1	9
OIL FRUIT											
<i>Olea europaea</i>	69	27	9	43	35	6	19	25	33	25	291
FRUIT											
<i>Vitis vinifera</i> , pips, charred	1	4		2	2	1				4	14
<i>Vitis vinifera</i> , grapes			1								1
WILD											
<i>Crataegus sp.</i>	1										1
<i>Galium sp.</i>		1	1		3	2				1	8
<i>Gramineae</i> indet.						1					1
<i>Pistacia sp.</i>	1										1
Indet.	28		9		11	2					50
Total	336	119	58	122	85	20	52	86	54	129	1061

Table 23.3. Archaeobotanical analyses from Area P South (EB IVA). *) Note: because of the huge amount of soil or other archaeological reasons, some samples have been divided into sub-samples.

Location	Samples (TM.89.G..., sample 50-...) Jars (TM.89.G....)
in front of hearth 8	64, 67 G.398/1
hearth 7	36, 44, 67, 70 G.391/1, G.398/1
in front of hearth 6	45-A, 59 G.397/1
hearth 6	35, 41 G.397/1
in front of hearth 5+6	49, 77-A, 77-B G.397/1
hearth 5	43, 51, 71-A, 72 G.384/1, G.383/1, G.396/1, G.397/1
hearth 4	68
hearth 3	79-A, 79-B G.395/1
hearth 2	88-A, 88-B, 88-C, 88-D G.394/1
hearth 1	9, 40, 99 G.393/1
surface in front of the hearths	8, 37, 69-A, 97, 102-A, 106,
jar G.388/1 (between L.2834 & L.2890)	38-A, 38-B, 39-A, 39-B, 91-A

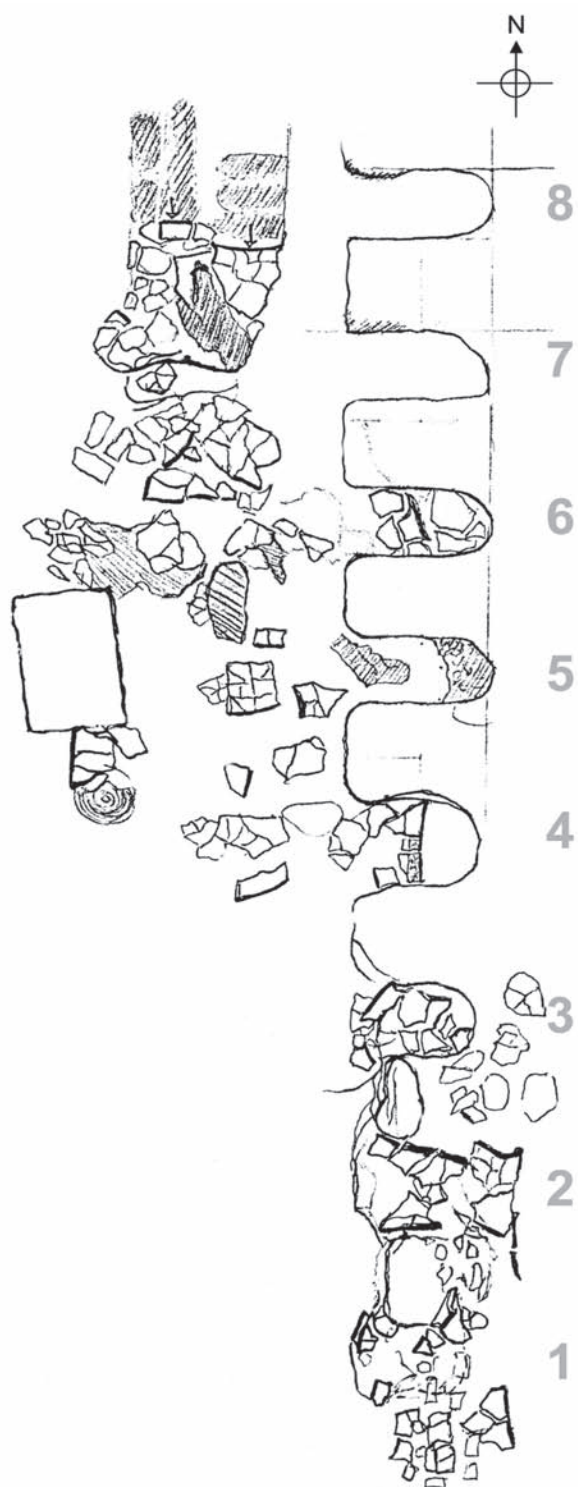
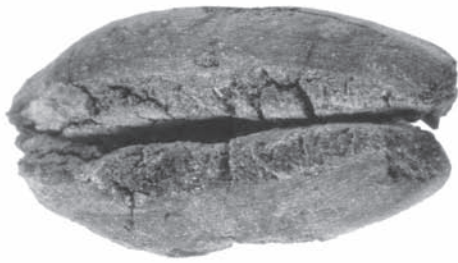


Table 23.4. Archaeobotanical samples from room L.2890, Royal Palace G.

No.	SCIENTIFIC BOTANICAL NAME	ENGLISH NAME
1	ANACARDIACEAE	sumac family
	<i>Pistacia atlantica/palestina</i>	terebinth
2	APIACEAE (UMBELLIFERAE)	carrot or parsley family
	<i>Coriandrum sativum L.</i>	coriander
3	ASTERACEAE (COMPOSITAE)	daisy family
	<i>Anthemis/Matricaria</i>	chamomile
	cf. <i>Carduus sp.</i>	thistle
4	BORAGINACEAE	forget-me-not-family
	<i>Heliotropium sp.</i>	heliotrope
	<i>Lithospermum arvense L.</i>	field gromwell
5	CHENOPODIACEAE	goosefoot family
	<i>Chenopodium sp.</i>	goosefoot
	<i>Salsola sp.</i>	saltwort
6	CONVOLVULACEAE	bindweed family, morning glory family
	<i>Calystegia sp.</i>	hedge bindweed
7	DIPSACEAE	wild teasel
	<i>Cephalaria syriaca L.</i>	syrian scabious
8	EUPHORBIACEAE	spurge family
	<i>Euphorbia sp.</i>	spurge
9	GRAMINEAE	grass family
	<i>Aegilops sp.</i>	goat-face grass
	<i>Avena cf. fatua L.</i>	common wild oat
	<i>Bromus sp.</i>	bromegrass
	<i>Lolium temulentum L.</i>	darnel
	CULTIVAR	crop cereals
	<i>Hordeum vulgare L.</i>	six-row barley
	<i>Hordeum disticum L.</i>	two-row barley
	<i>Triticum aestivum/durum</i>	bread wheat/durum wheat (free threshing wheat)
	<i>Triticum compactum</i>	club wheat
	<i>Triticum dicoccum</i> Schrank	emmer
	<i>Triticum monococcum L.</i>	einkorn
	<i>Secale cereale L.</i>	rye
	<i>Cerealía</i> indet.	unidentified cereals
10	LEGUMINOSAE (FABACEAE)	legumes, pea family
	<i>Astragalus sp.</i>	milk vetch
	<i>Coronilla sp.</i>	crown vetch
	<i>Hippocrepis sp.</i>	horse-shoe vetch
	<i>Lathyrus sativus L.</i>	grass pea

No.	SCIENTIFIC BOTANICAL NAME	ENGLISH NAME
	<i>Medicago</i> sp.	medick
	<i>Trifolium/Melilotus</i>	clover/sweet-clover
	<i>Scorpiurus muricatus</i> L.	caterpillar plant
11	CULTIVAR	crop legumes
	<i>Cicer arietinum</i> L.	chickpea
	<i>Lens culinaris</i> MEDIK.	lentil
	<i>Pisum sativum</i> L.	garden pea
	<i>Vicia ervilia</i> (L.) Willd.	bitter vetch
	<i>Vicia faba</i> L.	broad bean
	<i>Leguminosae</i> indet.	unidentified legumes
12	LILIACEAE	lily family
	(one unidentified species)	-
13	LINACEAE	flax family
	<i>Linum usitatissimum</i> L.	flax
14	LYTHRACEAE	loosestrife family
	<i>Punica granatum</i> L.	pomegranate
15	MALVACEAE	mallow family
	<i>Malva</i> sp.	mallow
16	OLEACEAE	olive family
	<i>Olea europaea</i> L.	olive
17	PAPILIONACEAE	pea family
	(unidentified species)	-
18	RANUNCULACEAE	buttercup family
	<i>Ranunculus arvensis</i> L.	corn buttercup
19	ROSACEAE	rose family
	<i>Crataegus</i> sp.	hawthorn
	<i>Rubus</i> sp.	brambles
20	RUBIACEAE	bedstraw family
	<i>Galium cf. tricornis</i> WITH.	three-pronged bedstraw
	<i>Galium</i> sp.	cleavers, bedstraw
	<i>Sherardia arvensis</i> L.	field madder
21	THYMELACEAE	daphne family
	<i>Thymelaea</i> sp.	thymelaea
22	VITACEAE	grape family
	<i>Vitis vinifera</i> L.	grapevine

Table 23.5. Catalogue of seeds from Ebla.



TM.88.G.336, sample 79, *Hordeum vulgare*
l = 5.9 mm



TM.88.G.336, sample 79, *Triticum dicoccum*
l = 6.4 mm



TM.90.P.633, sample 144, *Triticum monococcum*
l = 6.1 mm



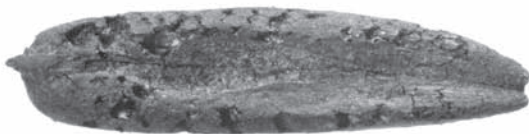
TM.88.G.336, sample 79, *Triticum dicoccum*
spikelet forks



TM.88.G.336, sample 79, *Triticum aest. durum*
l = 4.8 mm



TM.88.G.336, sample 79, *Triticum compactum*
l = 3.5 mm



TM.88.G.336, sample 79, *Secale cereale*
l = 6.9 mm



TM.88.G.336, sample 79, *Cicer arietinum*
Ø = 4.2 mm

Figure 23.1. Selected seeds from Areas G and P (EB IVA).



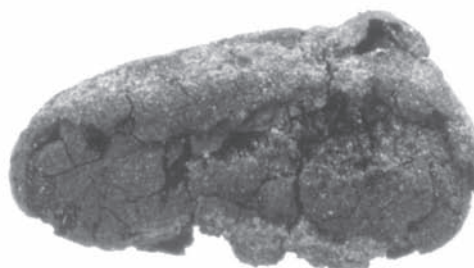
TM.88.G.336, sample 79, *Lens culinaris*
 $\varnothing = 3.5$ mm



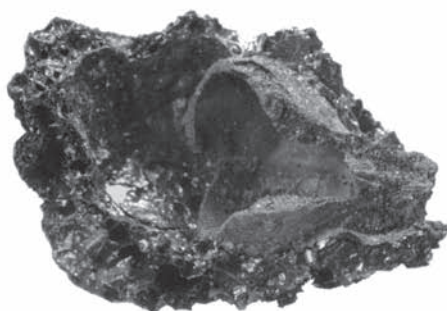
TM.88.G.336, sample 79, *Vicia ervilia*
 $\varnothing = 2.9$ mm



TM.88.G.260, sample 25, *Olea europaea*
 $l = 11.2$ mm



TM.90.G.105, sample 99, *Punica granatum*
 $l = 3.2$ mm



TM.88.G.336, sample 79, *Vitis vinifera*, fruit
 $l = 8.2$ mm



TM.90.P., sample 221, *Vitis vinifera*
 $l = 4.6$ mm



TM.88.G.336, sample 79, *Aegilops*
 $l = 4.4$ mm



TM.88.G.334/1, sample 80, *Astragalus*
 $l = 3.0$ mm

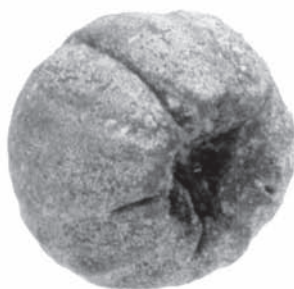
Figure 23.2. Selected seeds from Areas G and P (EB IVA).



TM.88.G.336, sample 79, *Bromus*
l = 5.0 mm



TM.90.G.105, sample 99, *Cephalaria syriaca*
l = 3.9 mm



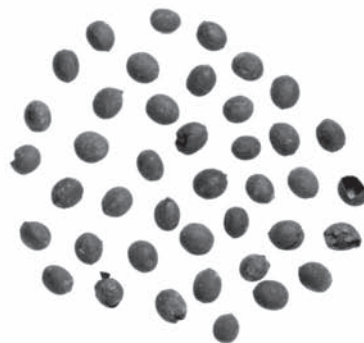
TM.88.G.336 sample 79, *Coriandrum*
Ø = 1.8 mm



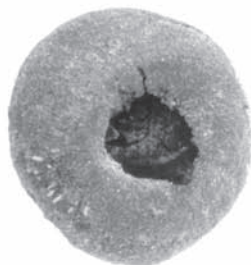
TM.88.G.336, sample 79, *Coronilla*
l = 4.5 mm



TM.90.G.105, sample 90, *Crataegus*
l = 7.0 mm



TM.89.G.397/1, sample 50-49, *Euphorbia*, group
Ø = 1.5 – 1.8 mm



TM.88.G.336, sample 79, *Galium*
Ø = 2.9 mm

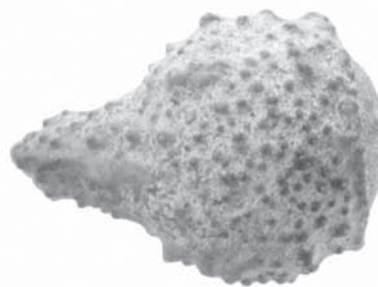


TM.88.G.336 sample 79, *Hippocrepis*
Ø = 3.3 mm

Figure 23.3. Selected seeds from Area G (EB IVA).



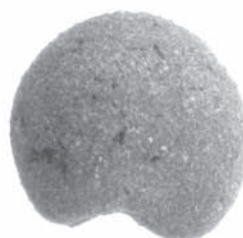
TM.88.G.336, sample 79, *Linum usitatissimum*
l = 3.0 mm



TM.88.G.336, sample 79, *Lithospermum arvense*
l = 3.2 mm



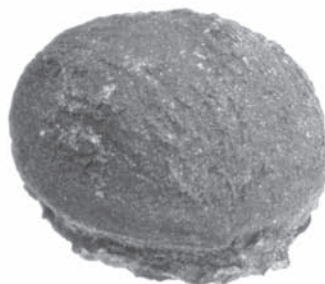
TM.88.G.336, sample 79, *Lolium temulentum*
l = 5.3 mm



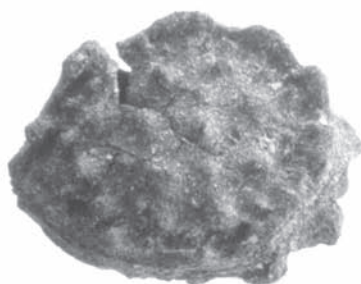
TM.90.G.105, sample 90, *Malva sp.*
l = 2.0 mm



TM.90.G.105, sample 90, *Medicago*
l = 3.3 mm



TM.90.G.105, sample 90, *Pistacia atlantica*
l = 3.5 mm



TM.90.G.105, sample 90, *Ranunculus arvensis*
l = 3.0 mm



TM.88.G.378/1, sample 1, *Thymelaea*
l = 1.5 mm

Figure 23.4. Selected seeds from Area G (EB IVA).

CHAPTER 24

FORESTS NEAR AND FAR

An Anthracological Perspective on Ebla

V. Caracuta and G. Fiorentino

1. INTRODUCTION¹

The development of the first urbanized societies in the Near East had a large impact on the natural environment, affecting vegetal cover as well as soil erosion rates. The expansion of cereal cultivation and livestock breeding, together with the rise of smelting activities, had widespread repercussions on the landscape (Renfrew 1979; Fall, Falconer, and Lines 2002; Redman 2004).

It may be assumed that the combined impact of human activities and climate change also led to massive changes in the area where Ebla was situated. Nowadays this part of Syria is semiarid, almost empty of arboreal plants, and is mostly devoted to extensive cereal cultivation. The present situation is thus quite different from what emerges from the epigraphic evidence found in Royal Palace G and dated to the Early Bronze IVA, which points to a variety of environments (Milano 1981; 1987a; 1990b; Archi 1999a).

The progressive destruction of regional forests probably started in the EB III, when the first urban settlement was established, and continued until the end of the city-state of Ebla, which is in Middle Bronze IIB (ca. 1600 B.C.).

The study of the exploitation of wood species through the analysis of charcoal remains from Ebla has proved to be relevant not only to historical reconstruction. In fact, analysis of the charcoal collected in the 2003–2007 field campaigns provided a unique opportunity both to investigate the processes, which led

to the impoverishment of the local ecosystem, and to conduct a realistic assessment of present trends in relation to the past (Fiorentino and Caracuta in press). However, caution is required when using charcoal for environmental studies, because this form of evidence does not reflect the ancient vegetation directly, but rather the human choices concerning fuel, carpentry, and other activities involving the use of wood.

This study took into account the context in which the evidence was collected and the way in which fresh wood was probably used. Species used as fuel were considered representative of local vegetation, since ‘economy of effort’ meant that it was logical and efficient to use locally available resources (Vernet 1997). On the other hand, species used for construction and furniture were assessed case by case, bearing in mind that the regional trade system could supply luxury and specialized goods over long distances.

Once local species were identified, we attempted to draw a picture of the landscape around Ebla and to detect the changes that occurred between EB IVA and MB I as a consequence of the human exploitation of natural resources and short-term climate changes.

2. ENVIRONMENTAL SETTING

With an average precipitation of 400 mm/y and an average temperature of 17°C, the site of Ebla, 50 km south of Aleppo, belongs to the subarid area of the Syrian territory that marks

the transition between the Mediterranean coastal landscape and the arid inland (Pabot 1957; Roberts and Wright 1993). The contrast between the arid eastern steppes and the more humid western belt is partially mitigated by the presence of the Jebel Arbayin, a hill covered by Mediterranean woodland, and of the river Quweiq, now almost dried up (Zohary 1973).

In good climatic conditions, water, wood, and land for cultivation were available nearby. Nevertheless, drought and anthropogenic factors (i.e., deforestation) drastically reduced these resources and limited the settlement development. Considering that the Ebla kingdom developed during a period of significant climate change, analysis of the anthracological evidence and of changes in its composition might tell us much about the city relationship with local resources.

3. CONTEXTS OF SAMPLING

The anthracological remains analyzed here were recovered during the 2003–2007 excavation campaigns, as charcoal dispersed in strata, concentrations of charred material, and burnt timber.

Within the scope of the specific research program aiming at reconstructing the use of territory by the township of Ebla, our interest was mainly devoted to the samples collected over the years in Royal Palace G. In this regard, the largest amount of samples analyzed was collected in the Administrative Quarter, and particularly in the Treasury Room (L.2982), in the Throne Room L.2866 and its annexes (L.8495 and L.8496), in the kitchen (L.2890), while other important samples were recovered in the Court of Audience L.2752, and in staircases of the Monumental Stairway.

As stated previously, in order to make a comparison on territory exploitation, many samples were also collected in MB I-II contexts (mostly residential areas, administrative buildings, and a votive well): domestic quarters, such as Area B East, were carefully sampled, with materials collected from a kitchen (L.8455), a courtyard (L.8454), a storeroom (L.9512), and

two cooking ovens (T.8662, T.8673). In all these loci wood was used as timber, furniture, and fuel. Information on timber and furniture, especially luxury handicrafts, was also inferred from the analysis of charred beams and poles found in the government buildings (Palace FF and Palace Q) and the Residency in Area Z. The investigation of primary contexts, such as those where wood was burned accidentally or intentionally in the location of use, was integrated with the investigation of secondary contexts, such as the midden of the Eastern Fortress (Area EE). The evidence found here included material that was burnt both before being discarded (layers 2–5) and after (layers 1–3–4–6–7). Finally, the sampling of the MB votive well (F.9308/F.9301), dug as part of a ritual for the temple built on the site of the EB IVA Temple of the Rock (Temple HH), provided data on the use and meaning of wood fuel/offerings in collective rituals.

4. METHODS

Samples of soil were collected from hearths, layers with high concentrations of burnt material, and deposits of discarded charred material from domestic and ritual activities. When wooden beams or residues of furniture were found burned in situ, handpicking of samples was preferred. All the soil specimens were wet-sieved to separate the mineral matrix from the flora and fauna remains.

The flots were dried, labeled, and identified by observing the main anatomical features of the charcoal remains on fresh fractures through dark and light field microscopy. Identification was carried out by consulting various atlases of wood anatomy (Greguss 1955; 1959; Fahn, Werker, and Bass 1990; Schweingruber 1990) and making comparisons with reference material collected in the field by the authors from a number of locations in Syria and stored in the Laboratory of Archaeobotany and Palaeoecology at the University of Salento. The use of such reference material was essential because of the large number of endemic species in the Near East.

5. THE USE OF WOOD IN EBLA

A total of 2849 anthracological remains were analyzed: 464 dating from EB IVA (Table 24.1) and 2,385 from MB I-II contexts (Table 24.2), which allows us to gain a diachronic perspective. Twenty-three taxa were identified: *Olea europaea* (olive) was the most frequent, but significant differences were found between the EB IVA and MB I-II phases and between different contexts within the same phase (Figure 24.1).

Most of the material recovered from Royal Palace G belongs to *Abies* sp. (fir), *Cedrus libani* (cedar), and *Arundo donax* (reed), with slightly smaller amounts of *Olea europaea* (olive) as well as fragments of *Platanus* sp. (plane tree), *Populus/Salix* (poplar/willow), *Fraxinus* sp. (ash tree), and *Pomoideae* (fruit trees) (Table 24.1 and Figure 24.2).

The high frequency of firs and cedars in Royal Palace G was explained by the need for luxury raw material for construction. Large chunks of beams and columns of cedar wood were found in the Treasury Room (L.2982) and in the annexes of the Throne Room (L. 8495, L.8496) (Figure 24.6). Fir was more ubiquitous, and several fragments in the form of residues of roof beams, together with remains of reed, were found in the kitchen of the Administrative Quarter (L.2890).

The wood used for furniture differed significantly from the one employed as timber for construction. The steps of the stairs (layer 4d) were made of plain wood, while a *Pomoideae* (fruit tree) and *Fraxinus* sp. (ash tree) were used for the manufacture of luxury pieces of furniture (a chair and a table, inlaid with mother-of-pearl) that were found in the room L.2601 (Figure 24.5). Also olive tree wood was used for the production of precious objects such as miniature statues plated in gold, found in the Court of Audience (L.2752).

The comparison with the following MB I-II periods shows significant differences: olive wood became the most popular species used for construction and as fuel, and remains of olive beams and charcoal were found in the private

houses of Area B East, in the Residency of Area Z, and in one room (L.8751) of Palace FF. On the other hand, Middle Bronze palaces feature a significant use of black pine (*Pinus* cf. *nigra*) and Aleppo pine (*Pinus halepensis*). Oaks (*Quercus calliprinos*, *Q. ithaburensis*, and an undetermined deciduous species) were found only in domestic contexts (Figure 24.4) and in the votive well (F.9308/F.9301), where they had been discarded as the residue of ritual fires (Fiorentino and Caracuta 2010). No more information can be inferred from the midden (Area EE), since remains of oaks were found both in the pits (layers 2–5), filled with charred debris probably resulting from the cleaning of cooking ovens, and in the hearth layers (Layers 1–3–4–6–7), where old timbers were thrown and probably burned in situ. Finds of the atlas mastic tree (*Pistacia khinjuk/atlantica*) were limited to the votive well and the midden (Table 24.2 and Figure 24.3).

Fruit trees such as *Pistacia vera* (pistachio), *Prunus* cf. *dulcis* (almond), and *Prunus* cf. *avium* (wild cherry) are significantly attested in EB IVA and MB I-II. Remains of wild cherry were found almost everywhere at the site, this species being used for furniture and fuel in domestic contexts (Area B East), as well as luxury goods, as testified by the evidence found in the MB I-II Palace FF.

6. NATURAL WOODLAND AND CULTIVATED PLANTS AS SOURCES OF WOOD

Ecologically, the twenty-three identified species vary in their provenance, reflecting the complex system of supply at the base of the Ebla economy. On the basis of the types of wood employed in furniture production and in building, it is possible to maintain that in EB IVA these materials were chosen for reasons of status regardless of the cost and the effort necessary to obtain them.

Cedar and fir may have been imported from the anti-Lebanon mountain range or the Amanus Mountains. These regions were largely exploited for wood since the third millennium B.C., also by southern Mesopotamia, as documented by the inscription of Gudea of Lagash, dated from

the twenty-second century B.C. (Rowton 1967; Linder 1986).

The only information about the environment that can be inferred from the EB IVA contexts concerns the presence of a riverine forest, probably on the banks of the nearby Quweiq, which yielded *Populus/Salix* (poplar/willow), *Platanus* sp. (plane tree), and *Fraxinus* sp. (ash tree). Residues of this woodland appear to have survived until the MB I-II, since *Fraxinus* sp. was used as fuel in domestic ovens and *Ulmaceae* were discarded in the votive well.

During MB I-II, olive, almond, and pistachio groves might have been planted around the site of Ebla, as indicated by the presence of remains of such species in hearths and ovens; yet, textual evidence supports the hypothesis that such species had been cultivated since EB IVA (Archi 1991; Milano 2006; see also Wachter-Sarkady, in this volume).

As stated before, more species are attested in the Middle Bronze period: pruning provided fuel for cooking, and fruit species were purposely selected as fuel for ritual hearths. Analyses reveal that oaks, mastic trees, and pistachios were also chosen for this purpose, so if we assume that the first species to be used for fuel was the nearest available, we may infer that these species were the closest to the site (Miller 1990; Willcox 1991).

Q. ithaburensis, *Q. calliprinos*, and *Pistacia khinjuklatlantica* were all to be found in the local woodlands, but *Quercus ithaburensis* and *Q. calliprinos* may have originated from the Mediterranean belt, the eastern edge of which is marked by the Jebel Arbayin, while the deciduous *Quercus* species and *Pistacia khinjuklatlantica* originated further east.

Timber for construction may thus have been the object of trade over relatively long distances (Willcox 1992), so the black pine is likely to have been imported from the Taurus Mountains, while the Aleppo pine, typical of the Mediterranean maquis, probably grew in the

site's surroundings (Fiorentino and Caracuta in press).

7. CONCLUSIONS

The study of the use of wood species in Ebla through the analysis of charcoal remains has thrown light on the purposes for which wood was employed, on the origin of raw materials, and consequently on the distribution of natural woodland.

As a result, we have shown that during EB IVA, timber used for the construction of palaces, such as *Abies* sp. and *Cedrus* sp., was imported from the anti-Lebanon and/or Amanus Mountains. On the other hand, the evidence from MB I-II contexts shows that pine, above all black pine, was preferred as timber in palace buildings. Nowadays, the distribution of *Pinus nigra* is limited to the Amanus Mountains, close to the Turkish border (Zohary 1973).

On the basis of the available evidence we should infer that in MB I-II locally available wood, such as *Olea europaea* and *Prunus* cf. *avium*, was preferred in private houses buildings and furniture manufacture, while it is quite likely that since EB IVA fruit trees, including *Prunus* cf. *dulcis* and *Pistacia vera*, which had ritual significance, were cultivated in orchards or preferentially selected from the available wild resources.

Finally, the natural woodland was characterized to the east by *Quercus-Pistacia* steppe-forests, and in the western hills by Mediterranean trees. Between these two ecological zones there was riparian vegetation, probably on the banks of the nearby river Quweiq. In fact, remains of riparian vegetation are also recorded in EB IVA contexts, but the evidence is too scanty to infer information about the distribution of such resources and the impact of their use by humans between EB IVA and MB I-II.

The study of paleoclimate, based on the isotopic signature of plant macroremains, reveals that EB IVA was characterized by moister conditions than MB I-II (Fiorentino et al. 2008; 2012;

Roberts et al. 2011). It may be assumed that the overexploitation of wood for timber and fuel, together with the clearing of land for agriculture, increased the rate of soil erosion, resulting in a shift in the climax vegetation from forests to lower plant communities. Nonetheless, the processes could not have been completed during the few centuries of EB IVA, and it must be assumed that during MB I-II there were still plenty of woodlands available.

Anthracological analyses in the wider surrounding region (Willcox 1974; Deckers 2005; Deckers and Riehl 2004; 2007; Pessin 2007; Fiorentino and Caracuta in press) have shown that the natural arboreal vegetation in the subarid areas between the Mediterranean and

the desert further inland was mainly composed of steppe-forest. Our study shows that around Ebla in the Bronze Age this vegetation was interrupted by orchards and, in the Jebel Arbayin to the northeast, by Mediterranean forest.

NOTES

- The authors wish to thank Prof. Paolo Matthiae, director of the Ebla Archaeological Expedition, for allowing them to study the archaeobotanical remains. Special thanks also to Luca Peyronel, Francesca Baffi, Marco Ramazzotti, and Alessandra Enea, who took care of all our needs in the field. Without their helpful assistance, this research would not have been possible.

ARCHAEOLOGICAL CONTEXT	FUNCTION	USE OF WOOD	<i>Abies</i> sp.	<i>Cedrus libani</i>	<i>Pinus halepensis</i>	<i>Pinus sylvestris</i> type	<i>Cupressus</i> sp.	<i>Arundo</i> cf. <i>donax</i>	<i>Capparis</i> sp.	<i>Fraxinus</i> sp.	<i>Leguminosae</i>	<i>Olea europaea</i>	<i>Pistacia</i> cf. <i>vera</i>	<i>Pistacia</i> cf. <i>palaestina</i>	<i>Pistacia khinjuk/atlantica</i>	<i>Platanus</i> sp.	<i>Pomoideae</i>	<i>Populus/Salix</i>	<i>Prunus</i> cf. <i>avium</i>	<i>Prunus</i> cf. <i>dulcis</i>	<i>Quercus deciduous</i>	<i>Quercus</i> cf. <i>calliprinos</i>	<i>Quercus</i> cf. <i>ihaburensis</i>	<i>Rhamnus/Phillyrea</i>	<i>Ulmaceae</i>
L.2982	Treasury Room	carpentry/ furniture	4	26	6	-	-	-	-	1	-	-	-	-	-	9	1	-	-	-	-	-	-	-	-
L.2890	kitchen	//	115	-	-	-	-	61	-	-	-	17	-	-	-	2	-	-	-	-	-	-	-	-	-
Liv.4D	stairs	//	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
1030	unknown	//	4	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
L.8496	Administrative Quarter	//	12	31	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
L.8495	//	//	39	29	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-
L.2752	Court of Audience	//	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L.8606	staircase	//	-	-	-	-	-	-	-	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-	-
L.8612	room	//	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L.2601	room	//	-	-	-	-	-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-
L.8729	sacellum	mat	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL=464			224	86	6	-	-	67	-	4	-	28	-	-	-	35	13	1	-	-	-	-	-	-	-

Table 24.1. Royal Palace G, EB IVA.

PHASE	ARCHAEOLOGICAL CONTEXT		FUNCTION	USE OF WOOD	Abies sp.	Cedrus libani	Pinus halepensis	Pinus cf. nigra	Cupressus sp.	Arundo donax	Capparis sp.	Fraxinus sp.	Leguminosae	Olea europaea	Pistacia cf. vera	Pistacia cf. palaestina	Pistacia khinjuk/atlantica	Platanus sp.	Pomoideae	Populus/Salix	Prunus cf. avium	Prunus cf. dulcis	Quercus deciduous	Quercus cf. calliprinos	Quercus cf. ithaburensis	Rhamnus/Phillyrea	Ulmaceae	
MBA	Domestic context B-est	L.8454	courtyard	carpentry/furniture	-	-	16	-	-	-	3	-	-	135	-	-	-	-	7	-	29	-	1	1	-	-	-	
		T.8662	cooking oven	fuel	-	-	21	-	-	-	-	31	-	317	-	-	-	-	-	-	69	-	4	1	-	-	-	
		L.8455	kitchen	carpentry/furniture	-	-	1	-	-	-	-	-	-	61	-	-	-	-	-	-	-	-	1	-	-	-	-	
		T.8673	cooking oven	fuel	-	-	50	-	-	-	25	-	-	68	-	-	-	-	-	-	8	-	2	-	-	-	-	
		L.8650	room	carpentry	-	-	-	-	-	-	-	-	-	15	-	-	-	-	-	-	-	-	-	-	-	-	-	
		L.9512	storeroom	carpentry/furniture	-	-	1	-	-	-	-	-	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Layers 2-5	pits	oven fuel	-	-	-	1	-	-	-	-	-	5	136	18	12	15	-	2	-	33	-	24	24	19	1	1
		Layers 1-3-4-6-7	hearths	carpentry/furniture	-	-	-	-	-	-	-	-	-	-	78	25	7	19	-	3	-	48	-	47	39	38	-	6
		F:9308/E:9301	votive well	oven fuel	-	2	-	2	1	-	5	2	-	283	39	-	7	-	-	-	-	63	31	204	26	115	4	8
		397		ritual fuel/offering	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Noble house Z	709			-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		L.7513			-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		564			-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		550			-	-	-	2	-	-	-	-	-	5	-	-	-	-	-	-	2	-	-	-	-	-	-	-
		L.7890			-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		L.7860			-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		L. 3006			-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		L.8278			-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		L.8277		carpentry/furniture	-	-	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
		L.8277		carpentry/furniture	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Palace Q	L.3146		carpentry/furniture	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		L.3146		carpentry/furniture	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		L.3145		carpentry/furniture	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
				carpentry/furniture	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
				carpentry/furniture	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Palace PF	L. 8751	room		-	-	-	1	-	-	-	-	-	11	-	-	-	-	-	-	59	-	-	-	-	-	-		
	TOTAL=2385			-	3	101	18	1	0	33	34	5	1126	82	19	41	0	12	0	311	31	283	91	172	5	17		

Table 24.2. MBA contexts.

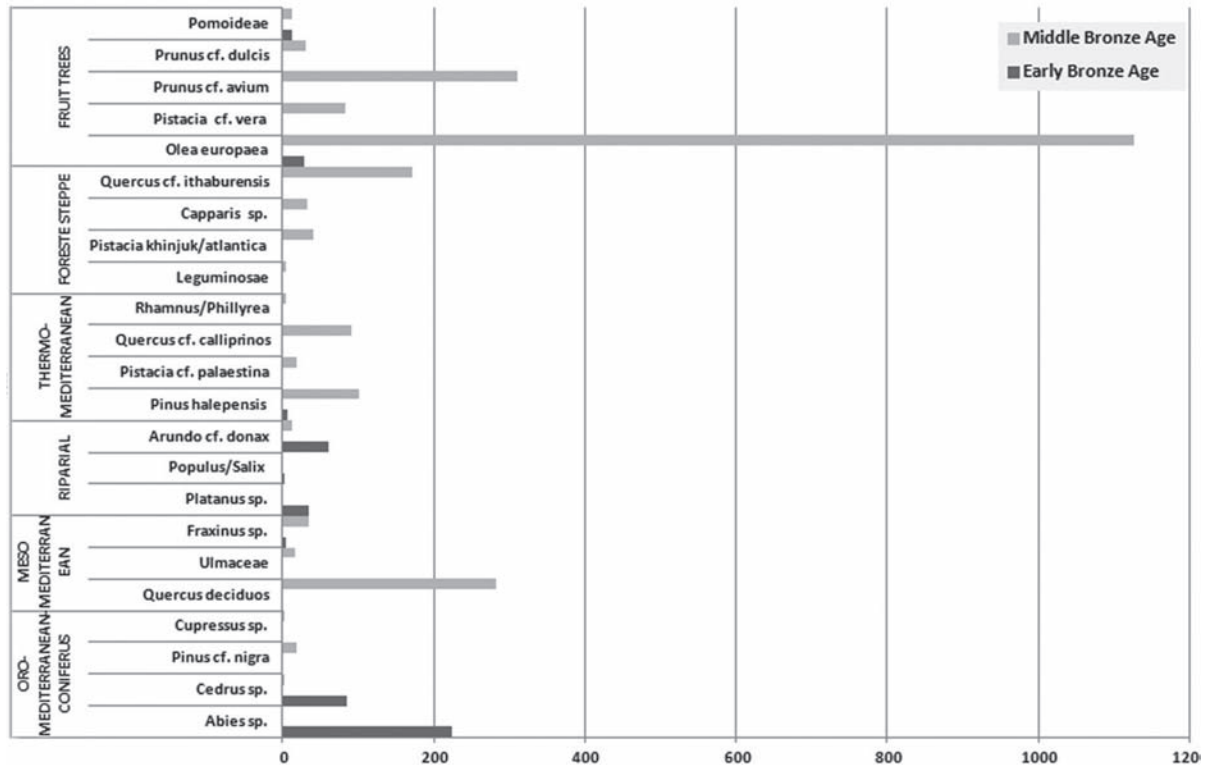


Figure 24.1. Comparison between the species found in EBA and MBA contexts. The woody plants have been listed according to the eco-geographic group to which they belong (vertical axis).

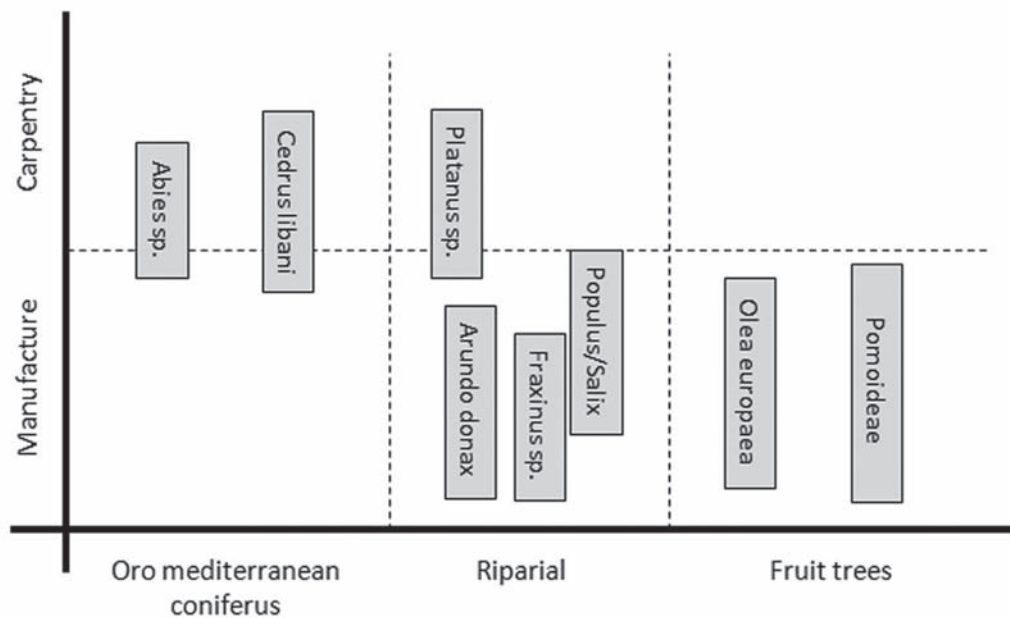


Figure 24.2. Table showing the function of each species in the EBA, as inferred from the findspots.

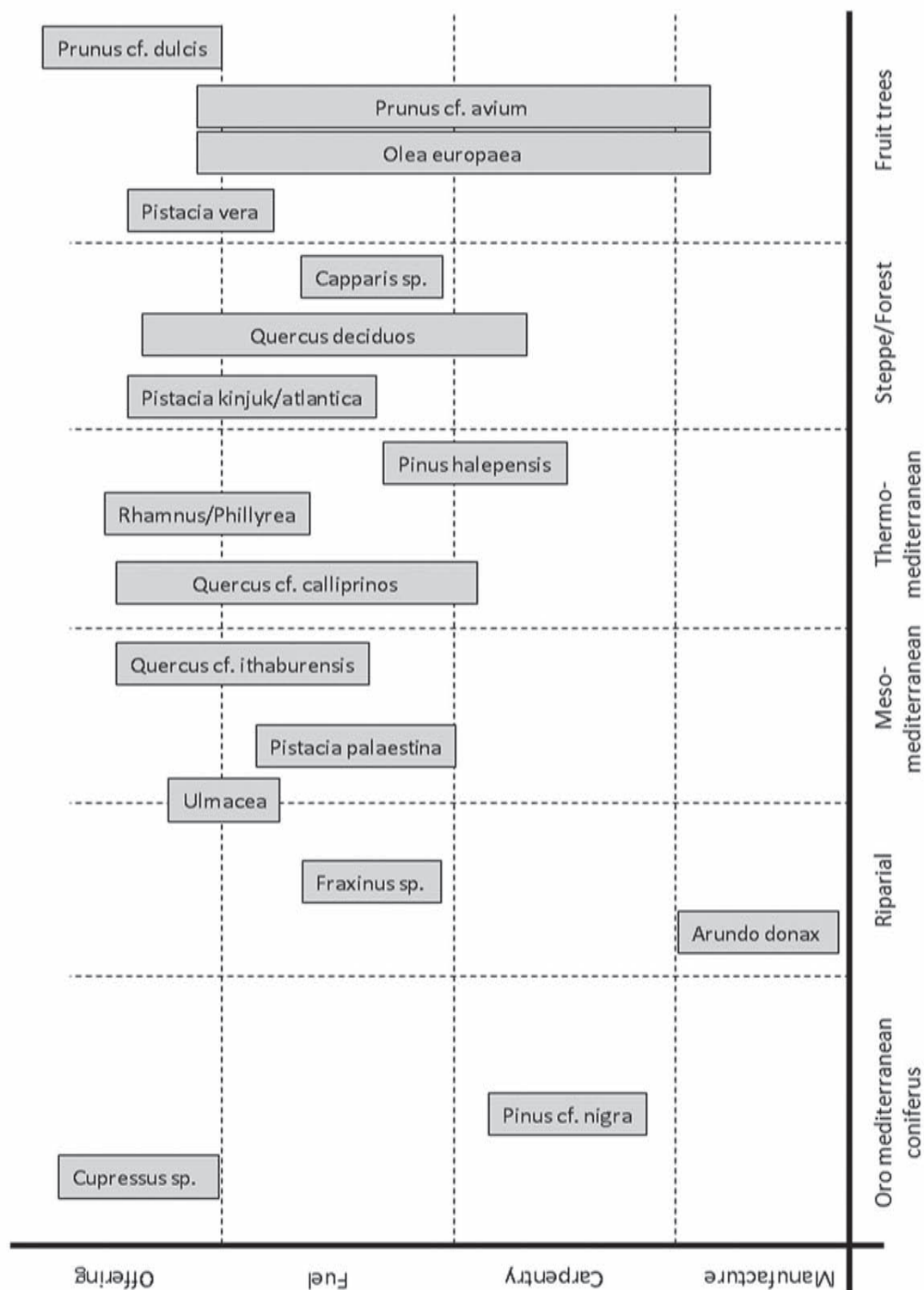


Figure 24.3. Table showing the function of each species in the MBA, as inferred from the finds.

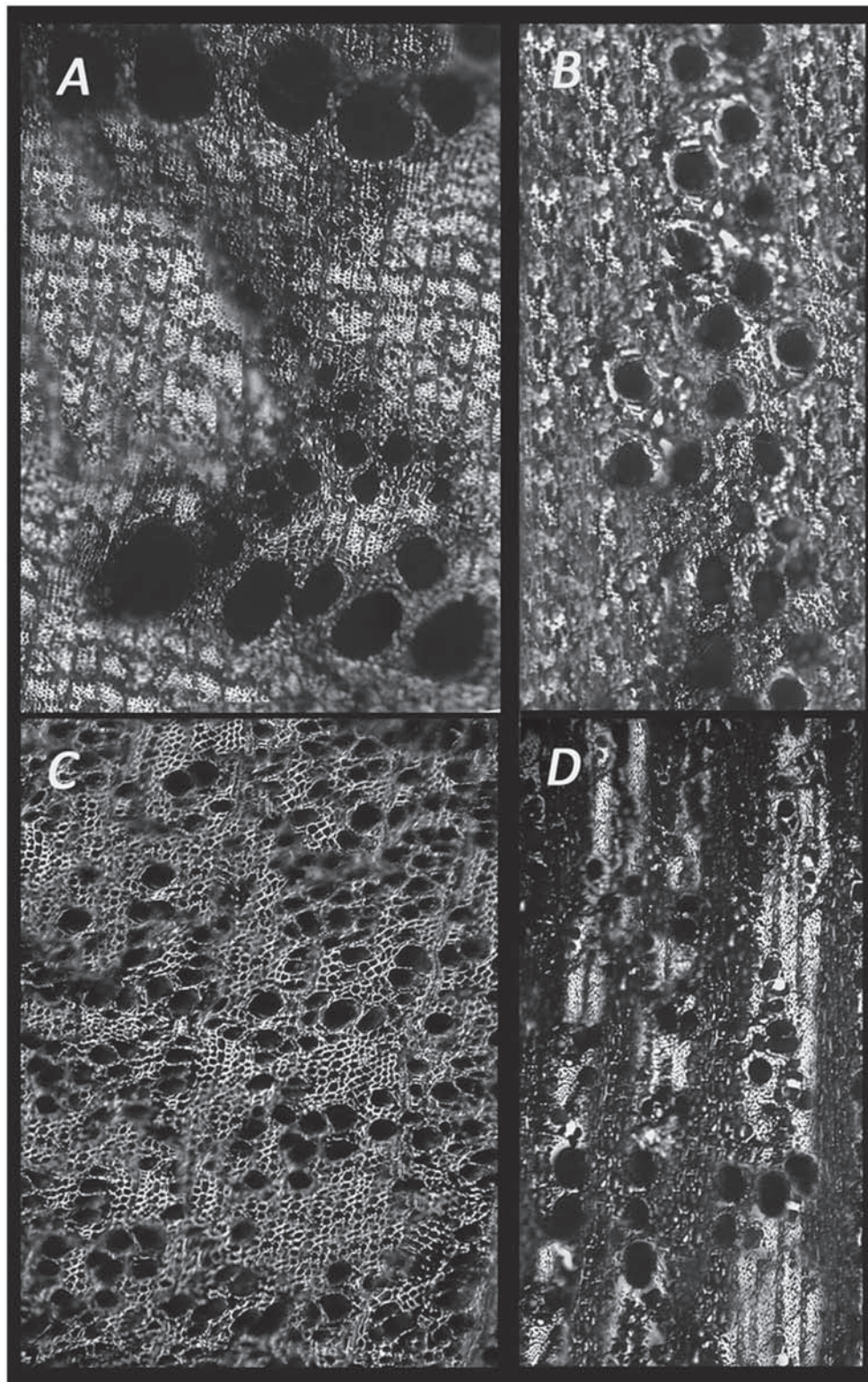


Figure 24.4. Transversal section of four different taxa: A) *Quercus deceduous*, B) *Quercus* cf. *calliprinos*, C) *Rhamnus/Phillyrea*, D) *Prunus* cf. *dulcis*.

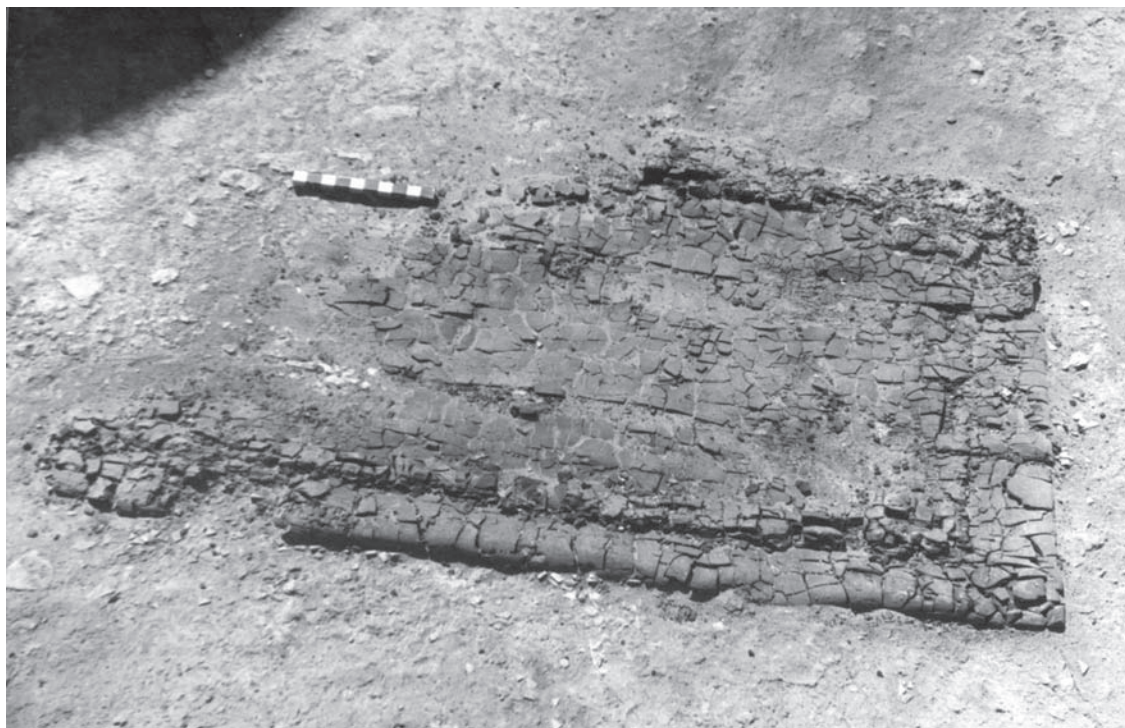


Figure 24.5. Ebla, Royal Palace G (EB IVA), wooden table from L.2601.



Figure 24.6. Ebla, Royal Palace G (EB IVA), rooms L.8495 and L.8496.



Figure 24.7. Ebla, Area B East, oven T.8602 (MBA).

CHAPTER 25

EXPLOITING ANIMALS

The Zooarchaeological Evidence through the Early Bronze Age at Ebla

C. Minniti

1. MATERIALS AND METHOD

This paper discusses the study of two animal assemblages from the Early Bronze Age layers brought to light in Ebla during different excavation seasons. The first sample comes from Area G and refers to the layers dated to the EB III that lie below the Royal Palace G complex, dating to the age of the Archives (Matthiae 1993b). The second assemblage was brought to light in Area P South from the layers dated to EB IVA (Marchetti and Nigro 1995–1996).

Animal bones from all contexts were excavated by hand. The mammal bones were recorded following Barone (1980) and Schmid (1972). The smallest fragments, ribs, and vertebrae were not identified according to species, but were recorded as either unidentified or just as ribs or vertebrae. The sheep/goats distinction has been attempted using the criteria described in Boessneck (1969), Kratochvil (1969), Payne (1985), and Halstead and Collins (2002).

The analysis of the skeletal elements distribution has been conducted according to the sequence of survival suggested by Brain (1976). This sequence is used to facilitate an easier comparison between the survival body parts of the main domesticates and to eliminate the bias deriving from the different preservation status of different bones and species.

Information on the state of epiphyseal fusion was collected for all long bones following Silver (1969) for cattle, Bullock and Rackham (1982)

for sheep/goats, and Bull and Payne (1982) for pigs. Wear stages were recorded for the lower teeth of sheep/goats and for the upper and lower molars of pigs, both isolated and in jaws. Tooth wear stages follow Payne (1973) for sheep/goats and Bull and Payne (1982) for pigs.

Gnawing, butchering traces, and working traces were also recorded and described where necessary. Measurements follow von den Driesch (1976). In order to maximize the information potential of the data, the log ratio technique of Simpson, Roe, and Lewontin (1960) was used to look at size variation in domesticates where there were insufficient numbers of individual measurements. The length, width, and depth measurements for each species were kept separate as suggested by Davis (1996), as there is better correlation between measurements taken along the same axis than between those along different axes. The standard used for the calculation of caprine log ratios was the mean of a sample of unimproved Shetland ewes (*ibidem*).

2. THE ANIMAL ASSEMBLAGE OF THE EB III PERIOD FROM AREA G

Animal bones were recovered from layer 9 across Area G, and only part of them were brought to light in well-identified rooms. Most of the animal bones were in an excellent state of preservation. A few specimens were burnt. No articulated part or whole skeletons were identified. The animal bones mainly belong to domestic species ([Table 25.1](#)). Sheep/goats are the predominant taxa

according to the number of identified specimens (NISP), followed by cattle. Other domesticates such as pigs and wild species, in particular hare and birds, are present but very rare. A bone belonging to an equid was also found. Its small size suggests that it could have belonged to a donkey or a wild ass.

The identification of sheep and goat bones to species level was attempted on a limited range of elements, of which sixteen were identified as sheep. Only three definite goat identifications were obtained in the whole assemblage from Area G. The sequence of anatomical distribution shows the highest presence of lower teeth, in particular of permanent molars (Table 25.2 and Figure 25.1: A). This is a consequence of the differential preservation of bones and teeth. The distribution pattern of the postcranial elements clearly shows a balanced representation of all body parts. Both large elements (such as scapulae, humeri, pelvises, tibiae) and small elements (such as phalanges) were identified, suggesting that recovery bias is not responsible for the observed skeletal distribution: rather, this is due to the absence of particular waste disposal patterns or specialized activities.

The fusion data (Table 25.5) show that most animals were adult and mature, although a number of juvenile sheep/goats are also present (9 percent). The wear stage of the lower teeth (loose and in mandibles) seems to confirm this pattern (Figure 24.2), suggesting two killing peaks, the first between the first and the fourth year of the life of the animal (50 percent), the second after the fourth year (39 percent).

The skeletal elements distribution of the cattle bones was similar to that of sheep/goat bones, with a high proportion of teeth to postcranial material, probably due again to the differential preservation of bones and teeth (Table 25.2 and Figure 25.1: B). The presence of most postcranial bones reflects that the sample is not affected by recovery bias and that no obvious deposition of parts was utilized for a specific purpose.

The epiphyseal fusion data show that most cattle from Ebla were adult animals and a few were killed before their second year of life (Table 25.6).

The distribution of animal remains across the identified rooms is as follows:

L.5130

The remains of almost seven sheep/goats (five adults and two juveniles), three cattle (two adults and one juvenile), and one adult hare come from this room. No articulated part or whole skeletons were identified. Teeth are the most common elements, and they are mainly represented by loose teeth. The presence of body parts bearing different quantities of meat, even if in different proportions, suggests no obvious deposition of parts utilized for a specific purpose (meat consumption, bone working, etc.).

L.5528

Very few bones belonging to sheep/goats and cattle were found.

L.7704

A larger variety of species characterizes the animal remains coming from this room. Sheep/goats still remain the dominant species, followed by cattle. Pigs and equids are represented respectively by a first phalanx and a proximal fragment of humerus. Hare and wild birds are present with few specimens. Sheep/goats remains could belong to four individuals (one adult, two immature, and one juvenile).

3. THE ANIMAL ASSEMBLAGE OF THE EB IVA PERIOD FROM BUILDING P4 (AREA P SOUTH)

The animal assemblage was mainly recovered in different rooms of Area P South (belonging to Building P4), while a small part was evenly scattered across the same excavation area and did not come from specific rooms. The preservation of the material was in general fairly good. The assemblage is dominated by bones of the main domestic animals (Table 25.3). Wild animals, as red deer, gazelles, hares, and wild birds, are very

rare. Sheep/goats represent the most common taxa. A number of articulated whole and part skeletons were recovered from different rooms of Building P4. They included the almost part skeletons of four sheep and the part skeleton of a piglet. Details are given in the analysis carried out by room.

Concerning the overall distribution of body parts for sheep/goats, the proportion of teeth and phalanges is higher than the proportion of other postcranial elements, which are more equally represented (Table 25.4, Figure 25.3: A). The presence mostly of bones reflects that no obvious deposition of parts was utilized for a specific purpose. No selection of body parts was made on the articulated skeletons. The mortality data show that animals from Area P were both young and adult (Table 25.5, Figure 25.2).

As in the case of sheep and goats, the skeletal element distribution of the cattle remains shows a high proportion of teeth and phalanges (Table 25.4, Figure 25.3: B). No different pattern of deposition has been observed. The epiphyseal fusion data show that most cattle from Area P were adult animals, but, compared to Area G, a larger number of bones belonging to immature individuals is present (Table 25.6).

The distribution of animal remains by rooms is as following:

L.5007

Most of the skeletons of two young sheep have been found inside a small hollow dug into the floor of the room, containing charcoal. Knife marks were noted on the femur and the metacarpal around the proximal end, suggestive of the skinning and/or dismembering of the carcass at this point. Bones are not fused. This suggests that the animals were killed before the first year of age. The wear stage of the milk teeth seems to confirm it, showing that the animals were killed between the second and the sixth month. Few bones (atlas, calcaneum, scaphoid, and first phalanx) of an adult sheep were also found associated with the two lambs. Most postcranial elements of another sheep were put in the jar.

Bones are not fused, suggesting that the animal was less than one year old. Animal remains from different species were found in another jar: few bones of the lower leg of a common buzzard (*Buteo buteo* L.), two bones of sheep/goat, and two specimens of unidentified fish.

L.5021

A skeleton of a very young pig was found in this room between the grinding tables on bench B.5233 and the wall. The twenty-eight bones belonging to the same individual were from different body parts—including skull and limb and fore elements. The absence of some bones is due to preservation and recovery biases. The individual represented was neonatal (all epiphyses are not fused and the milk third molar is still in process of eruption). No butchery marks have been identified. A fragment of humerus belonging to a sheep/goat was associated with the piglet. Other scattered bones collected inside the room include a second phalanx of cattle and a humerus of a large size bird, probably a stork.

L.5214

Animal remains from different species were found scattered in the room. Sheep/goats are dominant, with the remains belonging to our individuals (two adults, one immature, and one juvenile), followed by cattle, represented by two animals (one adult and one immature). Hare and birds are also represented, by one individual each. One bird bone probably belonged to a great black-backed gull (*Larus marinus* L.). A burnt shell of Conidae with holed apex was also found. Butchery marks have been recorded on some cattle bones: chop marks have been observed on a proximal femur, while cut marks due to skinning have been noted on a diaphysis of the first phalanx.

L.5216

Only a cervical vertebra (axis) of sheep/goat comes from the room.

L.5220

The vast majority of animal remains coming from this room belonged to sheep/goats. They

belonged to two sheep and one goat (two adults and one immature). A first phalanx of goat has clear-cut marks on the diaphysis, probably due to skinning. A burnt fragment of cattle metacarpal lay on the floor. A first phalanx of *Cervidae* (probably red deer) was also found.

L.5236

Only a cervical vertebra (axis) of sheep/goat comes from this upper floor, collapsed over L.5214 and still preserving materials in situ.

L.5312

A part articulated skeleton of immature sheep was found in this accumulation between L.5236 and W.5317. The twenty-five bones were mostly fore and limb elements. If some bones were lost, such as the smallest elements or more fragile parts, it is probably due to recovery and preservation biases. A few teeth and fragments of maxilla and mandible coming from the same room could belong to the same individual. The animal was probably killed between fourteen and thirty-five months of age. In fact, the vertebrae, proximal humerus, distal radius, distal femur, and proximal tibia are not fused. By contrast, the distal humerus, distal tibia, distal metatarsal, proximal radius, and proximal phalanges are fused. Assuming that the caprine teeth coming from the same layer belonged to the same individual, the animal was probably killed by the time it reached wear stage between D and E, at around twenty-four or thirty months of age. Cut marks have been noted on the two humeri, on the distal end. Three sheep/goat bones (fragment of skull, atlas, and proximal humerus) were found inside a jar. They could belong to the same sheep skeleton found in the room.

L.5315

Animal remains coming from this accumulation over the southern boundary wall W.5317 mostly belonged to sheep, goats, and cattle. Different postcranial elements of two adult sheep and one immature goat were documented. A first phalanx was clearly identified as belonging to a goat. Cattle is mostly represented by isolated

teeth and some elements from the extremities (metacarpal, phalanges), probably belonging to one individual.

4. DISCUSSION

The animal assemblages that were recovered from final EB III and EB IVA layers, brought to light in Areas G and P South, provide the opportunity to explore the economic activity of the EBA settlement. A comparison with other faunal samples from Ebla previously studied and dated to the Middle Bronze Age (De Grossi Mazzorin and Minniti 2000; Minniti and Peyronel 2005), and with the samples from other EBA sites of northern Syria, provide the opportunity to study evidences of continuity and change in economic practices through time and to place our understanding of the settlement in the regional context.

Animal exploitation in EBA Ebla was based on the main domestic animals, cattle, sheep/goats, and pigs. Wild species were less numerous. A number of articulated whole and part skeletons belonging to domestic species were recovered from different rooms of Building P4.

The economy was mostly based on the husbandry of caprine livestock. The vast majority of ovicaprid remains, as well as most of the part skeletons found in Building P4, were identified as sheep.

The kill-off pattern in the two areas is similar. The variety of ages at which the sheep and the goats were slaughtered proves quite clearly that there was no specialization in ovicaprid husbandry. Meat, milk, and wool were considered valuable products. Most animals were killed between the first and the fourth year, and even at an older age, which suggests their use for meat and wool production. The articulated skeletons belonging to the young and immature sheep were probably slaughtered for their meat.

Cattle formed the second most numerous groups, and they are represented by similar percentages in the two areas. Cattle remains mostly belong to fully grown animals that were likely used for plowing, but also to immature specimens that could be directly exploited for

their meat. The butchery marks found on cattle bones seem to confirm the role of this animal in the diet of the inhabitants.

Pigs were very rare and were mainly represented by a part skeleton of a young individual found in room L.5021 of Building P4 and by a mandible of piglet and a first phalanx from Area G. This suggests that pig was probably not very important for the economy of the site.

Some differences can be observed comparing the frequency of the species in the two EB (III and IVA) assemblages with their frequency in the samples from the MB I and II assemblages—in particular those taken from a large dump located on the eastern rampart (Area EE) (*ibidem*) and from a refuse pit (F.5861/F.5701) located outside Northern Palace P (De Grossi Mazzorin and Minniti 2000) (Table 25.8). The quantity of animal remains varies considerably between the three contexts. This could be due to the different methods used for collecting materials during the excavations. In fact, the EB and MB II assemblages were recovered by hand-collection, while the MB I sample was recovered by sieving. Sheep and goats are still the dominant species, although their frequencies seem to vary noticeably, maybe once again because of the different recovery method. However, the possibility that the fluctuation reflects different functions and types of contexts cannot be excluded. The EB assemblages were in fact collected in public buildings, while the MB I-II materials are respectively the by-products of domestic and/or productivity activities (EE midden) and of ceremonial activities in Palace P (F.5861/F.5701).

The sheep mortality profile shows that more young individual less than one year old were killed in Area P compared with Areas G and EE (Figure 25.2). These data probably reflect a number of lambs killed for their tender meat. However, the majority of animals from all areas were killed between their first and the fourth year, suggesting that meat production was their main function. In addition, the high proportion of animals slaughtered between four and ten years of age reflects the importance of wool production in all periods.

As for the mortality data, only assemblages dating to EB (from both Areas G and P) and to MB I (from Area EE) provided enough biometric data to allow a comparison between periods. In order to obtain large-enough samples to make better comparisons, log ratios were calculated. Length measurements show an increase in the size of sheep/goats through time (Table 25.7, Figure 25.4). Considering also widths and depths (Table 25.7, Figures 25.5–6), the pattern that emerges is the same, with a significant increase occurring between EB and MB I.

Placing the animal bone assemblages from Ebla in the wider regional context, we can observe many similarities between Ebla and other contemporary sites of northern Syria (Table 25.8). During the EBA, the animal assemblage at Ebla was very similar to most other sites, like Tell Habuba Kebira (von den Driesch 1993), Tell Halawa (Boessneck and von den Driesch 1989), Tell es-Sweyhat (Buitenhuis 1986; Weber 1997), Tell Bderi (Becker 1988), Tell Khuera (Vila 1995), Tell Munbaqa (Boessneck and von den Driesch 1986), and Tell Tuqan (Minniti 2012).

Caprine remains dominate the assemblages. The frequencies of sheep/goats vary between 76 and 97 percent of the main domestic animals. The only slight anomaly is the low percentage of sheep/goat remains at Tell Afis (Wilkens 1999), which accounts for 69 percent, but this number is still consistent with a primary economy mainly based on ovicaprine husbandry. The vast majority of ovicaprine remains were identified as sheep.

Mortality data, available only from few sites, reflect mixed economies. Animals were killed at juvenile/immature age for meat and at adult/mature age for secondary products.

The proportions of cattle vary greatly, between 2 and 31 percent, while pigs never seem very important in the economy of the sites. Their remains account for a range comprised between 1 and 5 percent of domesticated animals. Cattle were mainly slaughtered when they reached four years or more. The majority would be kept until adult or old to be used for plowing, traction, and milk production, whereas few cattle would be

slaughtered when sufficiently grown up but still relatively young for meat production.

The percentages of wild species are generally rather low. The wild taxa spectrum is dominated by onager, red deer, fallow deer, roe deer, gazelles, hares, and other rarer animals, such as lions, bears, and beavers.

No particular change in economic practices during the MBA is documented. Sheep continued to be the dominant domestic species.

The presence of the different species in assemblages from long-occupied sites seems to vary differently through time, probably due to the different functions of the features excavated at the sites. At the sites of Tell Afis (Wilkens 1999; 2005), Tell Habuba Kebira (von den Driesch 1993), Tell es-Sweyhat (Buitenhuis 1986; Weber 1997), and Tell Halawa (Boessneck and von den Driesch 1989) sheep/goats were more numerous in the assemblages from the MBA than in those from the previous period. At Tell Tuqan (Minniti 2006; 2008) the presence of cattle and pigs seems to increase during the MBA. However at this site, as well as at Tell Hadidi (Buitenhuis and Clason 1978) and in some contexts in Ebla (De Grossi Mazzorin and Minniti 2000), the number of cattle remains is still greater compared to other sites of the same period. Furthermore,

at Tell Tuqan the high frequency of pigs is also an anomaly.

Von den Driesch (1993) and Weber (1997) suggested that the increase of the number of sheep/goats in most of the animal assemblages from northern Syria could reflect the continuous process of desertification that characterized the region through the Bronze Age. The consequent expansion of the arid vegetation that is typical of the steppe environment probably set up a place favorable to ovicaprine husbandry. Tell Tuqan could be located instead in a microclimatic area particularly favorable to pig husbandry (Baffi 2006c, 9)

Mortality profiles continue to show that cattle were mainly used for traction, sheep for meat and secondary products such as wool, and pig for meat.

Zooarcheological data from the assemblages dated to the Late Bronze Age come from the sites of el-Qitar (Buitenhuis 1988), Tell Munbaqa (Boessneck and von den Driesch 1986), and Tell Bderi (Becker 1988). At Munbaqa and Bderi the primary economies do not seem to have changed when compared to the previous periods, while at el-Qitar caprine and cattle remains are more equally represented. A greater variety of wild species is also noted in the assemblages dated to the LBA (Buitenhuis 1988).

	L.5130	L.5528	L.7704	SCATTERED
	NISP	NISP	NISP	NISP
Equids	-	-	1	-
Cattle	20	1	3	12
Sheep/Goat	86	4	21	32
Sheep	11	-	2	2
Goat	2	-	-	1
Pig	-	-	1	1
Hare	3	-	3	-
Bird	-	-	1	-
TOTAL	122	5	32	48
Ribs	36	3	12	11
Vertebrae	15	0	7	4
Unidentified fragments	53	3	22	39

Table 25.1. Ebla, number of animal bones and teeth (NISP) from area G.

	EQUID	CATTLE	SHEEP/GOAT	SHEEP	GOAT	PIG	HARE
Horncore	-	2	1	2	-	-	-
Horncore+cranium	-		3	-	-	-	-
Cranium	-	6	4	-	-	-	-
Maxilla	-		1	-	-	-	1
Upper teeth	-	5	20	-	-	-	-
Mandible	-	6	9	-	1	1	-
Lower teeth	-	2	30	1	-	-	-
Teeth	-	-	3	-	-	-	1
Atlas	-	-	1	-	-	-	-
Axis	-	-	2	-	-	-	-
Scapula	-	2	5	2	-	-	-
Humerus	1	1	13	-	-	-	1
Radius	-	1	3	4	-	-	-
Radius+ulna	-	-	1	1	-	-	-
Ulna	-	1	3	-	-	-	1
Metacarpal	-	1	6	-	-	-	-
Pelvis	-	1	8	-	-	-	-
Femur	-	-	3	-	-	-	-
Tibia	-	1	10	2	-	-	1
Metatarsal	-	2	8	-	-	-	1
Metapodial	-	2	1	-	-	-	-
Tarsal	-	1	-	-	-	-	-
Astragalus	-	-	2	1	-	-	-
Calcaneum	-	1	2	-	-	-	-
Phalanx 1	-	1	3	3	1	1	-
Phalanx 2	-	-	-	-	1	-	-

Table 25.2. Ebla, Area G, body parts of mammals by number of fragments (NISP).

	L.5007	L.5021	L.5214	L.5216	L.5220	L.5236	L.5312	L.5315	SCATTERED
Cattle	-	-	21	-	2	-	-	10	12
Sheep/Goat	2	1	26	1	13	1	12	10	43
Sheep	89*	-	16	-	4	-	26****	3	12
Goat	-	-	-	-	1	-	-	1	-
Pig	-	28***	-	-	-	-	-	-	-
Red deer	-	-	-	-	1	-	-	-	-
?Gazelle	-	-	-	-	-	-	-	-	1
Hare	-	-	4	-	-	-	-	-	-
Bird	4**	1	2	-	-	-	-	-	-
Fish	2	-	-	-	-	-	-	-	1
Total	97	30	69	1	21	1	38	24	69
Ribs	52	10	32	-	70	1	-	14	24
Vertebrae	40	10	33	-	6	1	12	23	20
Unidentified fragments	-	23	65	-	48	4	1	20	38

Table 25.3. Ebla, number of animal bones and teeth (NISP) from Area P South. *66 NISP from two skeletons of young sheep; **4 NISP from one skeleton of buzzard; ***28 NISP from one skeleton of piglet; ****26 NISP from one skeleton of immature sheep.

	CATTLE	SHEEP/ GOAT	SHEEP	GOAT	PIG	RED DEER	GAZELLE	HARE
Cranium	-	3	-	-	(4)	-	-	-
Maxilla	-	3	-	-	(1)	-	-	-
Upper teeth	3	9	{3}	-	(3)	-	-	-
Mandible	3	9	-	-	-	-	-	-
Lower teeth	7	11	{6}	-	(3)	-	-	-
Teeth	-	-	-	-	1	-	-	-
Atlas	-	4	1 {1}	-	-	-	-	-
Axis	-	5	1	-	-	-	-	-
Scapula	2	5	(2) [2] {1}	-	(2)	-	-	-
Humerus	1	7	4 (1) [2] {3}	-	(1)	-	-	-
Radius	-	6	(1) [2] {1}	-	(1)	-	-	1
Radius+ulna	-	1	-	-	-	-	-	-
Ulna	-	7	(1) [2]	-	(1)	-	-	-
Carpal	1	2	(1) [2] {2}	-	(1)	-	-	-
Metacarpal	4	4	2 [1] {3}	-	(4)	-	-	2
Pelvis	2	11	(2) [1] {3}	-	-	-	-	-
Femur	3	6	1 (2) [2] {3}	-	(2)	-	-	-
Patella	1	-	(2)	-	-	-	-	-
Tibia	1	5	4 (1) [2] {2}	-	(1)	-	-	-
Metatarsal	4	2	2 (2) [2] {1}	-	(1)	-	-	1
Metapodial	1	4	(1)	{3}	-	(1)	-	-
Tarsal	-	-	(1)	-	(1)	-	-	-
Astragalus	2	-	3 (2) {1}	-	-	-	-	-
Calcaneum	1	1	8 (1) {2}	-	(1)	-	-	-
Sesamoid	-	1	(1) {1}	-	-	-	-	-
Phalanx 1	3	3	9 (2) [2] {12}	2	-	-	1	-
Phalanx 2	5	-	1 (2) [3] {7}	-	-	1	-	-
Phalanx 3	1	-	3 {2}	-	-	-	-	-

Table 25.4. Ebla, Area P, body parts of mammals by number of fragments (NISP). Data from articulated skeletons are included in parentheses.

ELEMENT	AGE (MONTH)	AREA G		AREA P	
		UNFUSED	FUSED	UNFUSED	FUSED
Humerus d	<12	0	8	2	7
Radius p	<12	0	5	0	1
Pelvis a	<12	0	5	1	1
Scapula d	12	2	3	0	1
Phalanx 1 p	14–35	-	-	2	5
Tibia d	35	0	4	3	3
Femur p	35	-	-	3	2
Tibia p	48	3	2	2	0
Femur d	48	-	-	0	2
Metacarpal d	48	0	1	1	1
Metatarsal d	48	-	-	0	2
Metapodial d	48	1	0	1	1
Humerus p	48–60	2	0	1	0
Ulna p	48–60	-	-	0	1
Radius d	48–60	0	1	1	2
Calcaneum	48–60	0	1	2	6

Table 25.5. Ebla, Areas G and P, epiphyseal fusion of sheep/goats (a=acetabulum; p=proximal; d=distal). Data from articulated part skeletons found in Building P4 are not included. Details on their age were only described.

ELEMENT	AGE (MONTH)	AREA G		AREA P	
		UNFUSED	FUSED	UNFUSED	FUSED
Scapula d	7–10	0	1	0	1
Pelvis a	7–10	0	1	-	-
Humerus d	12–18	0	1	-	-
Phalanx 1 p	18	-	-	0	1
Phalanx 2 p	18	-	-	0	2
Tibia d	24–30	0	1	0	1
Metacarpal d	24–30	-	-	0	2
Metatarsal d	27–36	-	-	1	0
Metapodial d	27–36	2	0	1	0
Calcaneum	36–42	0	1	-	-
Femur p	42	-	-	0	1
Femur d	42–48	-	-	2	0
Humerus p	42–48	-	-	1	0
Radius d	42–48	0	1	-	-

Table 25.6. Ebla, Areas G and P, epiphyseal fusion of cattle (a=acetabulum; p=proximal; d=distal).

PERIOD	ELEMENT	MEASUREMENT	MIN	MAX	NO.	MEAN
EB III	Humerus	BT	25.1	33.2	5	-
EB III	Metacarpal	Bp	22.6	25.4	2	-
EB III	Metacarpal	Bd	24.9	-	1	-
EB III	Tibia	Bd	23.2	26.9	4	-
EB III	Tibia	Dd	18.1	21.4	4	-
EB III	Calcaneum	GL	60.0	-	1	-
EB III	Log ratio depths	-	-0.034	0.093	12	0.019
EB III	Log ratio widths	-	-0.032	0.04	4	-
EB IVA	Humerus	BT	26.2	32.3	6	-
EB IVA	Radius	Bp	30.8	-	1	-
EB IVA	Metacarpal	Bp	23.6	-	1	-
EB IVA	Metacarpal	Bd	26.4	-	1	-
EB IVA	Tibia	Bd	23.7	28.0	2	-
EB IVA	Tibia	Dd	19.7	20.8	3	-
EB IVA	Astragalus	GLI	26.0	29.8	5	-
EB IVA	Astragalus	DI	14.9	17.0	5	-
EB IVA	Astragalus	Bd	18.0	18.9	5	-
EB IVA	Calcaneum	GL	54.4	61.2	4	-
EB IVA	Metatarsal	GL	150.0	-	1	-
EB IVA	Metatarsal	Bd	23.6	26.2	2	-
EB IVA	Log ratio lengths	-	-0.012	0.092	10	0.033
EB IVA	Log ratio depths	-	-0.025	0.081	19	0.027
EB IVA	Log ratio widths	-	0.004	0.063	8	-
MB I	Humerus	BT	28.3	35.1	16	31.2
MB I	Radius	Bp	27.4	36.4	13	32.2
MB I	Metacarpal	Bp	22.0	25.6	3	-
MB I	Metacarpal	Bd	24.6	29.8	4	-
MB I	Tibia	Bd	24.6	28.8	8	-
MB I	Tibia	Dd	18.7	23.3	8	-
MB I	Astragalus	GLI	27.5	33.1	17	30.1
MB I	Astragalus	DI	14.7	19.2	15	16.7
MB I	Astragalus	Bd	17.4	21.4	19	19.2
MB I	Calcaneum	GL	59.0	61.0	2	-
MB I	Metatarsal	GL	156.0	-	1	-
MB I	Metatarsal	Bd	24.2	25.7	3	-
MB I	Log ratio lengths	-	0.005	0.109	21	0.053
MB I	Log ratio depths	-	-0.039	0.116	66	0.045
MB I	Log ratio widths	-	-0.018	0.116	23	0.051

Table 25.7. Ebla, sheep/goats, biometric data. Summary tables for measurements from Areas G (EB III), P South (EB IVA), and EE (MB I). Mean values have been only calculated for measurements with ten or more cases.

SITE	PERIOD	CATTLE	SHEEP/GOAT	PIG
Tell Afis 94 (G)	EB	30.5	64.1	5.3
Tell Habuba Kebira	EB	20.6	78.9	0.3
Tell es-Sweyhat (1973, 1974, 1975)	EB	11.5	87.9	0.4
Tell es-Sweyhat (1989, 1991, 1993) ph 1	EB	11.3	88.6	-
Tell Munbaqa	EB	19.2	80.5	0.2
Tell Halawa	EB	15.4	84.5	0.1
Tell Bderi	EB	2.0	97.2	0.6
Tell Khuera	EB	9.4	90.2	0.4
Ebla (G East)	EB III	18.5	80.5	1.0
Ebla (P South)	EB IVA	24	75.5	0.5
Tell Tuqan (P)	EB IIIB	10.6	88.6	0.8
Tell Tuqan (P)	EB IVB	4.7	95.3	0.0
Tell es-Sweyhat (1989, 1991, 1993) ph 2-3	EB-MB	23.0	76.9	-
Tell Afis (E)	EB-MB	9.7	84.5	5.8
Ebla (EE midden)	MB I	7.4	91.4	1.2
Ebla (F.5861/F.5701)	MB II	42.8	56.6	0.4
Tell Afis 94 (G)	MB	15.3	82.6	1.9
Tell Afis (N)	MB	9.3	82.6	8.1
Tell Tuqan (P)	MB II	13.9	67.7	18.9
Tell Tuqan 93	MB	27.4	54.4	18.1
Tell Tuqan (D)	MB	7.9	88.1	4.0
Tell Hadidi	MB	21.1	76.8	1.8
Tell Habuba Kebira	MB	14.8	84.7	0.3
Tell es-Sweyhat (1989, 1991, 1993) ph 4-5	MB	5.7	94.2	-
Tell Halawa	MB	9.5	90.5	-
Tell Afis 94 (G)	LB	12.7	82.0	5.2
Tell Afis (E)	LB	10.4	82.8	6.8
el-Qitar	LB	45.8	50.7	3.4
Tell Munbaqa	LB	23.9	75.9	0.1
Tell Bderi	LB	4.0	95.6	0.2

Table 25.8. Frequency of the main domestic species in northern Syria during the Bronze Age.

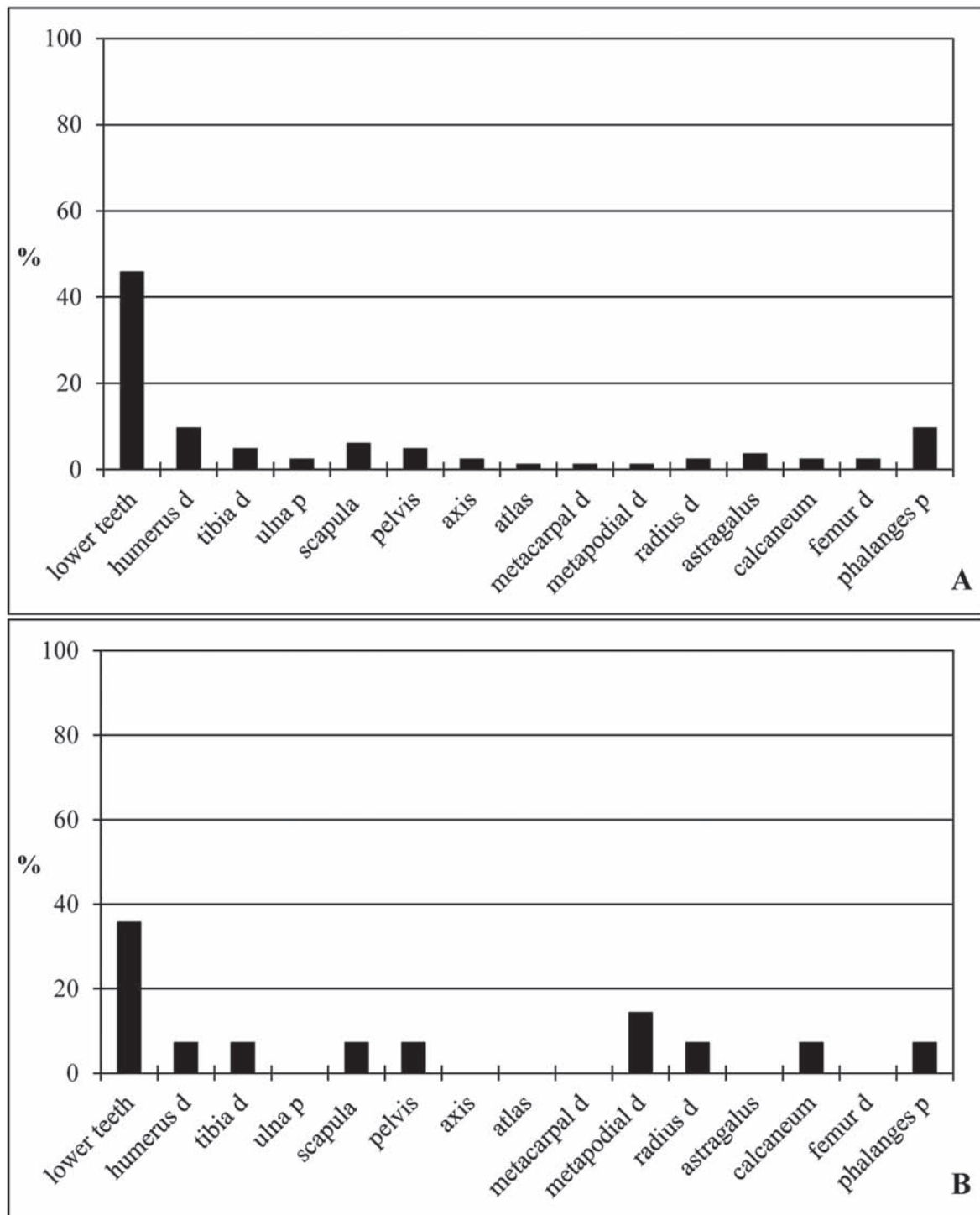


Figure 25.1. Ebla, percentage survival of the body parts of sheep/goat (A) and cattle (B) from Area G.

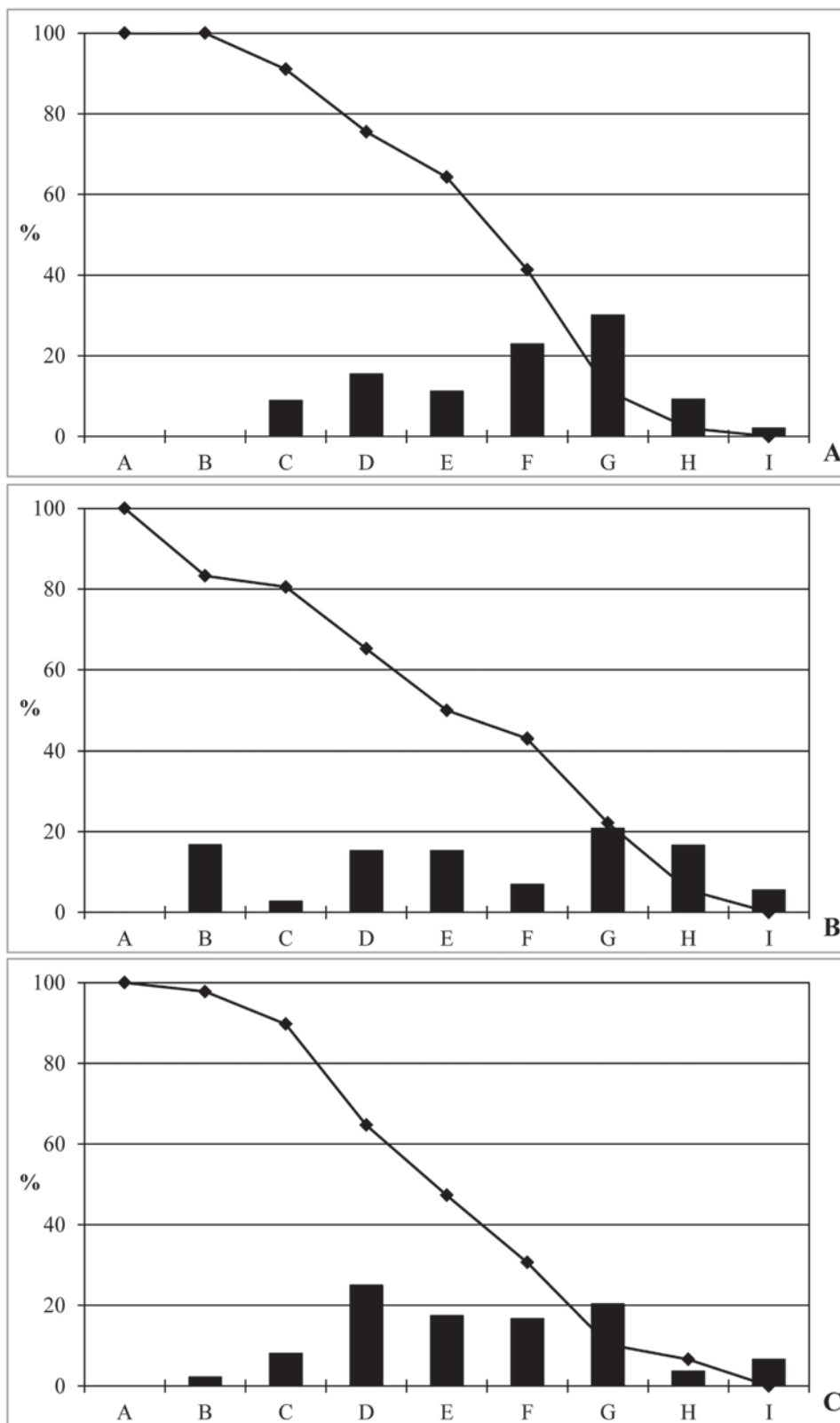


Figure 25.2. Ebla, sheep/goat: kill-off patterns from the tooth wear stage data by period (A = EB III; B = EB IVA; C = MB I).

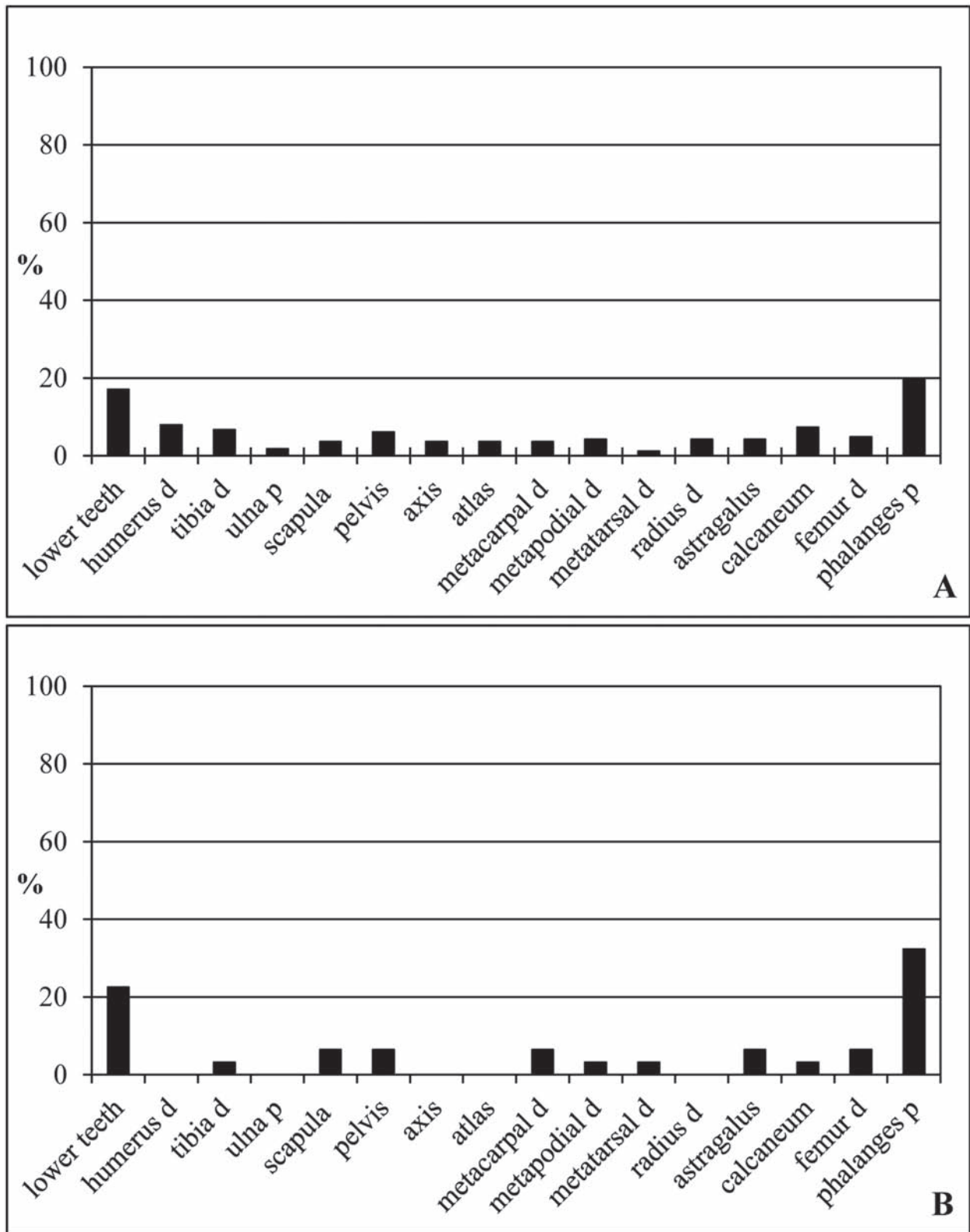


Figure 25.3. Ebla, percentage survival of the body parts of sheep/goat (A) and cattle (B) from Area P South.

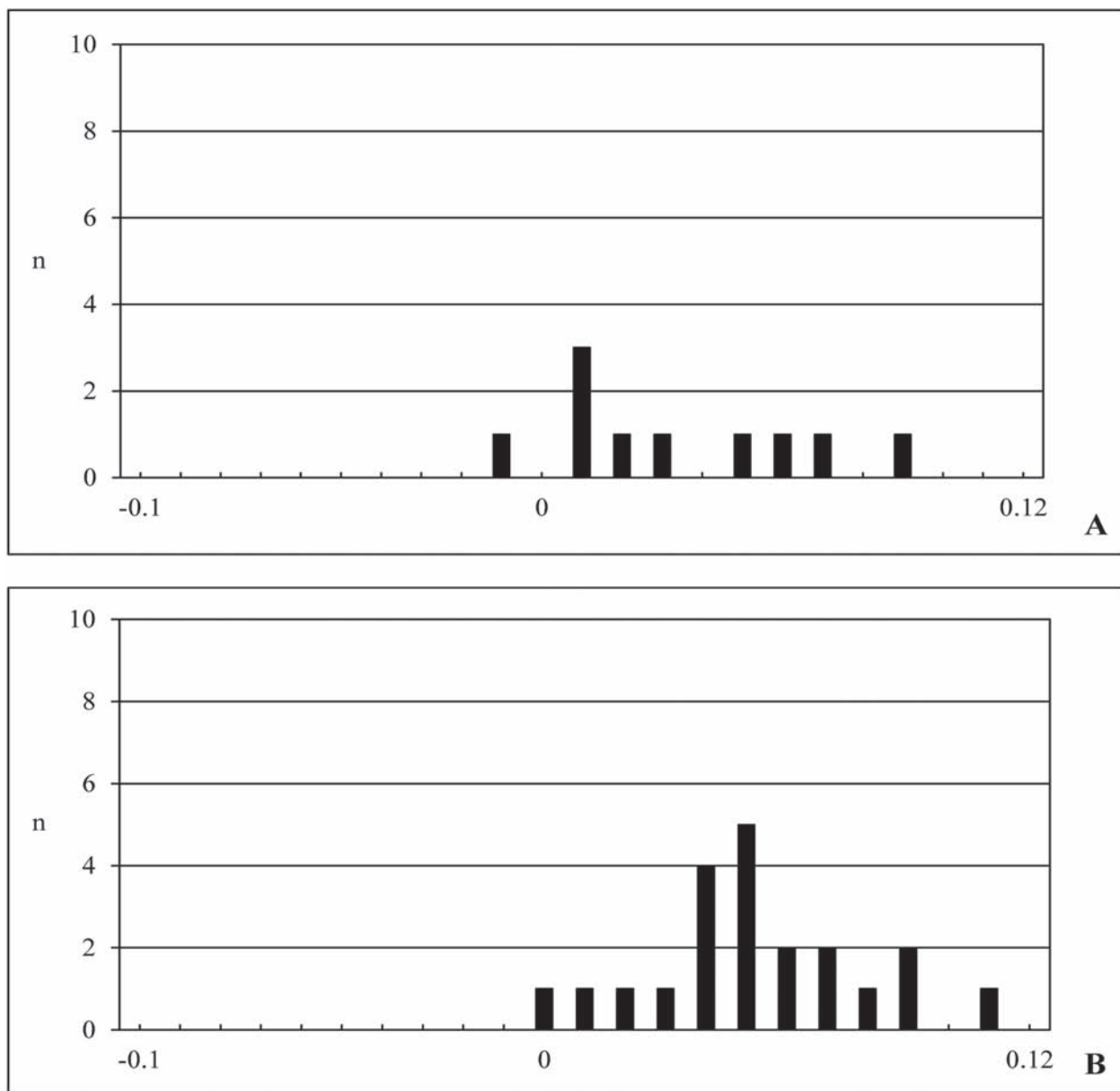


Figure 25.4. Ebla, sheep/goat: log ratio diagrams for length measurements by period (A = EB IVA; B = MB I).

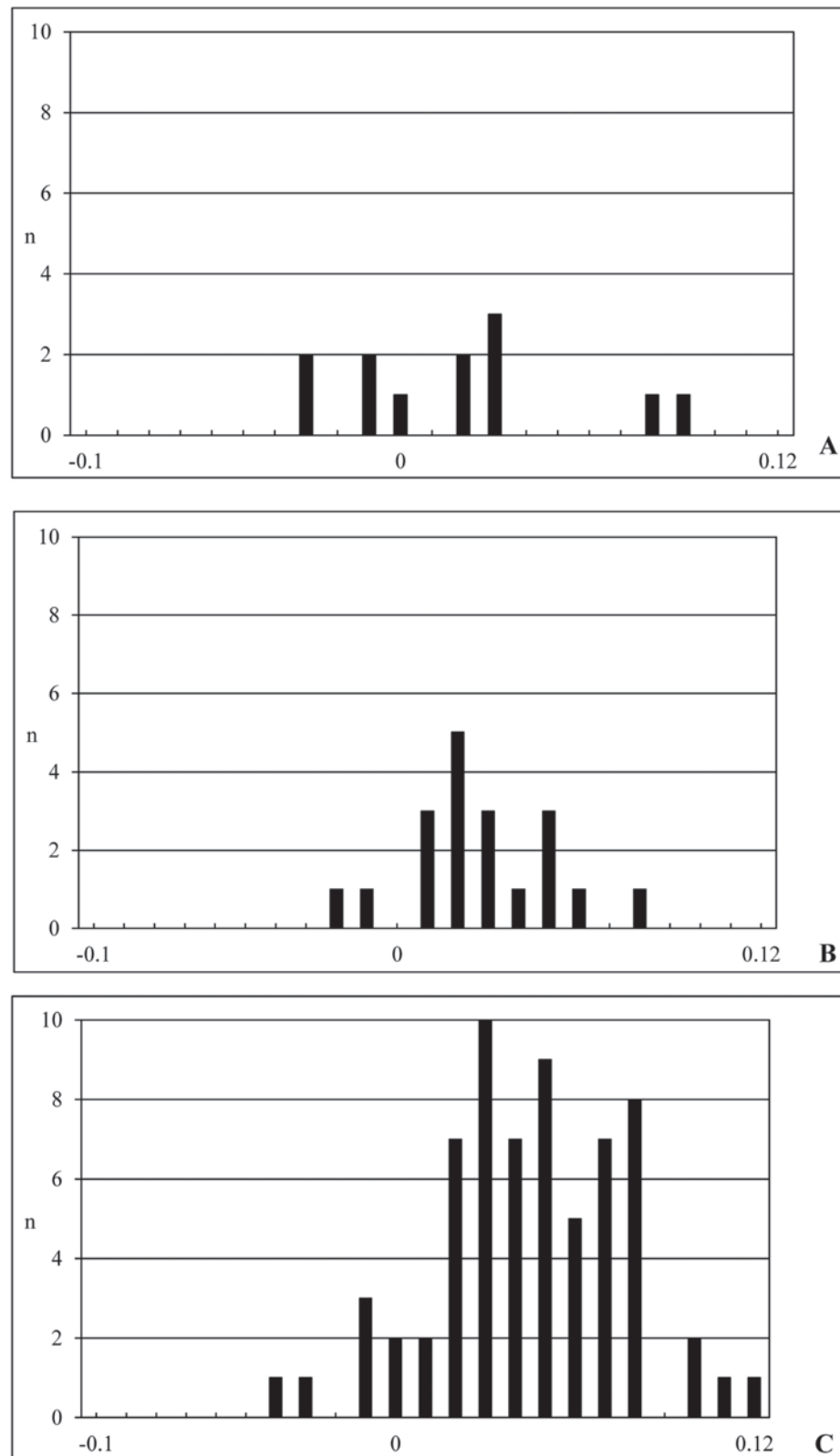


Figure 25.5. Ebla, sheep/goat: log ratio diagrams for width measurements by period (A = EB III; B = EB IVA; C = MB I).

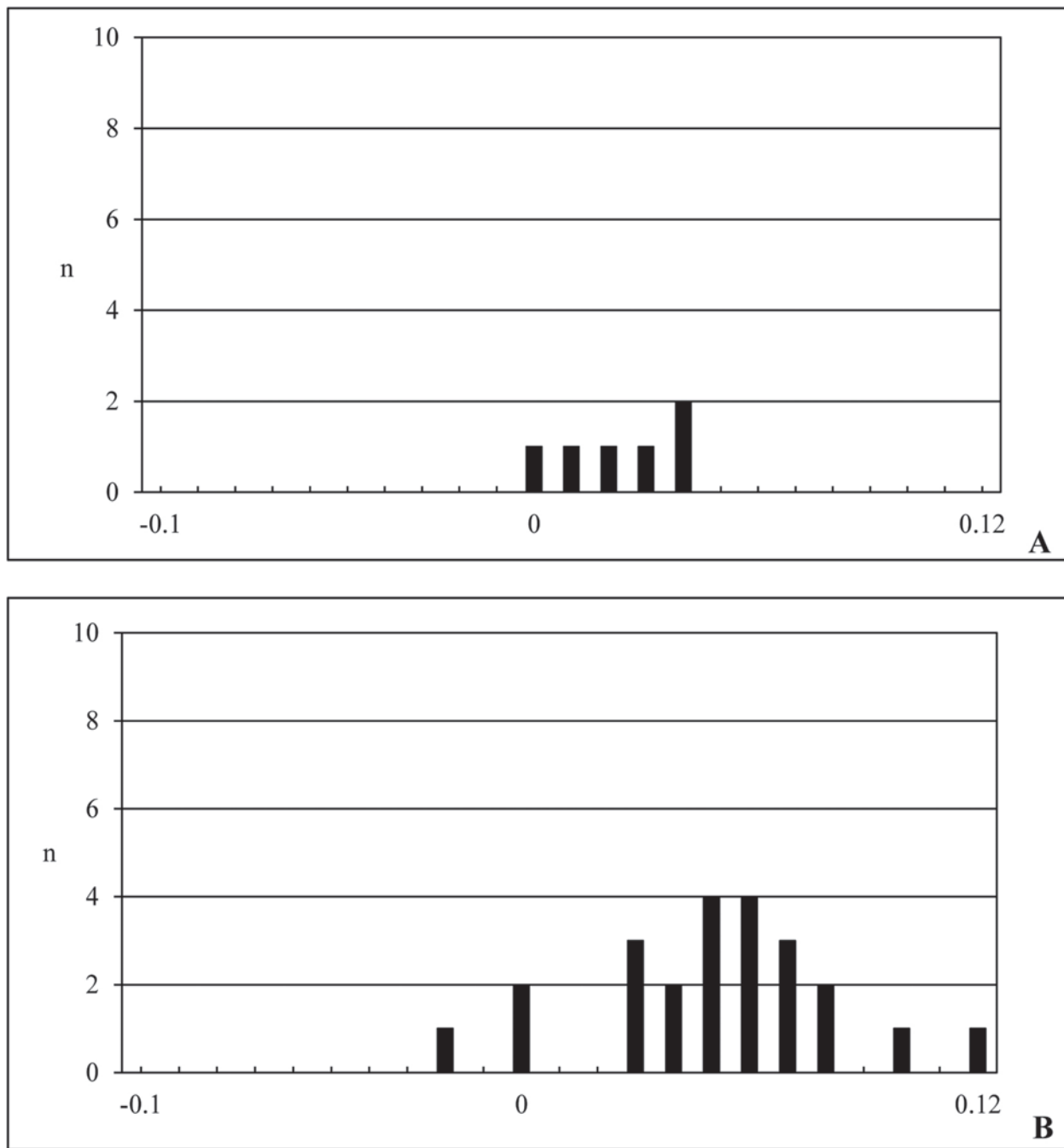


Figure 25.6. Ebla, sheep/goat: log ratio diagrams for length, width, and depth measurements by period (A = EB IVA; B = MB I).

CHAPTER 26

NATURAL RESOURCES, TECHNOLOGY AND MANUFACTURE PROCESSES AT EBLA A Preliminary Assessment

L. Peyronel and A. Vacca

1. INTRODUCTION

A wide multidisciplinary project of archaeometric analyses on material assemblages (pottery and clay objects, base and precious metals, stone and bone items) and bioarchaeological samples dating from the Early Bronze Age IVA (ca. 2400–2300 B.C.) was planned as a part of the Ebla Chora Project (ECP), in order to investigate primary production, manufacture processes, technological degree of specialization, and intersections between crafts and exchange systems at local and interregional levels. In particular, the pottery and architectural components analyses and the bioarchaeological researches have focused on the relationships between the urban town and its environment and the strategies of procurement, exploitation, and consumption of natural resources and raw materials in the region of Ebla, whereas precious and base metals have been studied in order to identify alloys, metalworking techniques, and operational processes that can be usefully compared with information coming from the cuneiform texts of Royal Palace G.

2. ROYAL PALACE G AND ARCHITECTURAL COMPONENTS

Royal Palace G (2400–2300 B.C.) is an impressive, monumental building. The investigated area is 4,500 m² wide, and includes the top, the western slopes, and the base of the central acropolis. Built on terraces sloping from north to south, the palace is composed of several architectural units, placed at different heights and connected by staircases. The different sectors of the palace

(the Administrative Quarter, the Central Unit West, and the Southern Quarter) are delimited by massive walls, serving also the purpose of containing terraces.

The palace was conceived following an incremental but organic plan, adapting the building to the morphology of the hill and to previous EB III structures (brought to light in different sectors of the acropolis). Several phases of rebuilding are attested in different rooms of the palace; floors were renewed several times,² while some modifications in spaces articulation were attained through the addition of rooms with thin mud-brick walls, as in the cases of Great Archive L.2769 and of rooms L.8495 and L.8496 in the Throne Room. A major rebuilding activity during a central phase of EB IVA (perhaps during the reign of Ishar-Damu) is attested by the so-called Red Temple (Temple D2) on the top of the acropolis in the West Unit (Matthiae 2009d; 2010b, 392–96).

The functional destination of spaces can be inferred both by the rooms plan and by the pattern of distribution of facilities and materials. In fact, Palace G was violently destroyed at the end of the EB IVA phase, and today it provides a likely picture of the actual organization of spaces in the last years of the palace's life.³

Archaeometric data integrate the architectural analysis, providing information about technologies and building techniques. The analysis of construction materials is also strictly

connected with the problem of exploitation of natural resources and the identification of their provenance. Materials employed in the Royal Palace G are mainly mud bricks (walls, benches, and stairs, [Figure 26.1:1](#)), basalt and calcareous stones (foundations, wells, sockets, and staircases, [Figure 26.1:2–3](#)), and timber (used for lofts, intermediates and first floors, stairs, columns, furniture, and shelves, [Figure 26.1:4](#)). Most of these materials are of local origin and were directly accessible in the Ebla surroundings, while a few others (as in the case of certain wood types) were imported from different areas (see below and § 4.3).

Royal Palace G was built with stout mud-brick walls set on stone foundations, which vary in size according to their static function and consequent wall thickness.⁴ Foundations are generally made of rough limestone blocks of different sizes and shapes and a rubble masonry fill. Not all the walls have stone foundations and some are made of simple rows of mud bricks (Margueron 1988, 51), as in the case of dividing or curtain walls.

Few studies have focused on the stone processing cycle (extraction, rough-off, transport, and arrangement), while information about materials is generally more abundant, although not systematic and rarely integrated by geological studies and identification of ancient quarries (Anastasio 2011, 45–49, 131).

In Royal Palace G, the main types of stones used are basalt and limestone. Basalt and calcareous stones were available in the site's proximity (Mantellini, Micale, and Peyronel, in this volume): basalt is found in the hills to the southeast of Ebla (ca. fifteen kilometers from the site), whereas limestone is largely attested at Tell Mardikh itself and in its surroundings. Pedological analyses at Ebla and Tell Tuqan have been conducted by Arnoldus (in this volume), who identifies different kinds of calcareous formations inside and around Ebla: a soft calcareous stone is present at Ebla and in its immediate vicinity, and a harder limestone, with large fossil shells, is found to the north and south of the site. The stone employed for EBA structures at Tell Mardikh is mainly of the latter type. The palace

walls have been built with flat rectangular mud bricks with a recurrent size of 60×40×12 cm, set together with a clay mortar. This size occurs in all the structures excavated at Ebla and dated to the EBA period, such as the Temple of the Rock (Temple HH) and the Red Temple (Temple D2). Palace G walls show alternated bricks of a grey/whitish and red colors; the difference in color is related to the choice of different soils available in the site proximity (e.g., the red cinammonic soil is characteristic of all the area around the site; see Arnoldus, in this volume).⁵

Mud bricks are made of a mixture of earth and chopped straw (see Santarelli and Spreafico, in this volume),⁶ which is then shaped in rectangular molds and ultimately sun-dried ([Figure 26.2](#)).⁷ Bricks of Palace G are laid horizontally and arranged in alternating rows of headers and stretchers in the same course ([Figure 26.3](#)), set together with a mortar join. The walls' surfaces are coated with plaster, which is used to protect them from atmospheric agents and to even out the facades (Santarelli and Spreafico, in this volume). Generally, plasters are applied in two or three coatings on the wall's surface: the first layer, adhering to mud bricks, is coarse (roughcast), and its composition is similar to that of mud bricks (clay and vegetable fibers); the second and third layers are made of a fine lime plaster (the lime makes the coat insoluble after its setting; see Aurenche 1981, 70). Characterization analyses show that Palace G walls were covered with two or three progressively finer coatings ([Figure 26.4](#)); the last layer was colored and its composition reveals the presence of a small percentage of gypsum among the aggregates. Also floors are made of two overlapping layers (5–7 cm thick) with high calcium content; the first layer is a crushed limestone bed, over which a finer layer of lime plaster is spread (Santarelli and Spreafico, in this volume).

The volumetric reconstruction of buildings (particularly concerning the original height of walls and the presence of upper floors) remains a problematic task, largely affected by post-depositional events and the preservation state of the structures (Margueron 1985; 1986). In

the Treasury Room L.2982 and in the Throne Room annexes (L.8495 and L.8496), large charred chunks pertaining to roof beams have been analyzed (Figure 26.1:4). Anthracological analyses (Caracuta and Fiorentino, in this volume) have shown that *Cedrus libani* was largely employed as timber for construction in those rooms. Carpentry elements are in most cases made of fir (*Abies* sp.), which is the most used type of wood, but also of plane (*Platanus* sp.), pine (*Pinus halepensis*), and poplar/willow (*Populus/Salix*), although to a lesser extent. Timber for construction (fir and cedar) was imported to Ebla both from quite distant regions (Lebanon and Amanus mountains) and from the forest on the banks of the Quweiq river (poplar/willow and plane trees) (see Caracuta and Fiorentino, in this volume).⁸

Carpenters (nagar-nagar) were specialized craftsmen with a high mobility (they were exchanged between courts of city-states).⁹ In the archives are recorded carpenters sent to Armi from Ebla and carpenters coming from Mari, Nîrâr, Ra'ak, and Huzan who were active in Ebla (Archi 1988a, 28; see also § 4.3).

3. ECONOMY

The economy of Ebla and its *chora* is largely based upon dry farming agriculture, husbandry, and commercial exchanges. All these features are well documented in the epigraphic sources from the Royal Archives. A wide project of multidisciplinary archaeometric analyses has been carried out within the Ebla Chora Project (ECP) in order to investigate the means of productions and the foundations of the Eblaite economy.

3.1. Agriculture

The area investigated for the Ebla Chora Project extends over approximately 3,000 km². This region corresponds to the Syrian upland and embraces different ecological zones: the limestone plain and the basaltic foothills around Tell Mardikh/Ebla, the depression of the Matkh, and the steppe area to the east (see Mantellini, Micale, and Peyronel, in this volume). The region falls in a semiarid zone, with an average annual

precipitation of about 250–300 mm (Rossi Pisa, Ventura, and Vignudelli, in this volume). Dry farming agriculture is possible under these conditions, in particular in the Ebla and Matkh areas,¹⁰ whereas moving to the east towards the desert/steppe area, cultivations become more precarious, at the risk of crop failure during drier years. Rain-fed farming agriculture is also confirmed by remote sensing analysis, which shows the absence of large ancient irrigation works within the Ebla territory (Galiatsatos and Mantellini, in this volume).

From the geological point of view soils are characterized by a low erodibility and a good structural stability. In this regard, Arnoldus-Huyzendveld (in this volume) suggests a low degree of soil degradation and substantially constant soil characteristics over thousands of years. After analyzing the modern agriculture in the Ebla region, Rossi, Ventura, and Vignudelli (in this volume) suggest the persistence of some Early Bronze Age crops in the area, such as olives and barley, due to the substantially similar annual rainfall and favorable climatic conditions.

Data on ancient agriculture and land use in the Early Bronze Age period are inferred from archaeobotanical analysis and textual evidence from Royal Archives (Table 26.1).

Several botanical samples collected in primary contexts of Royal Palace G allow us to identify plant species and define the food-processing activities that took place within the Royal Palace.

In particular, in the West Unit of the Central Complex several rooms were equipped with benches and a variety of grinding facilities (associated with charred remains of barley and wheats). This sector of the palace was devoted to food-processing activities (Matthiae 2010b, 379); different installations (basins, jars for cereal preservation, and benches furnished with grindstones) have been excavated in rooms of the West Unit (L.3914, L.4420, L.3926, L.3932, and L.3936) and of the Central Complex (L.3926, L.3932, and L.3936) (Figure 26.5).

The analysis of these rooms by Dolce (1988, 38–42; 1994, 302–3) allows us to reconstruct in detail the operative sequence of food processing and the spatial organization of the work, underlining the importance of the accumulation and transformation of primary products inside the public building. Moreover, analyses of archaeobotanical samples collected from rooms of the West Unit provide information about which kinds of food were processed within this sector of the palace (Wachter-Sarkady, in this volume). Samples coming from jars mostly indicate that cereals were preserved in order to be utilized daily for cropping activities. The jar contents mainly consist of barley and wheats (*Hordeum* and *Triticum*), while some seeds of wild taxa, olives (*Olea europea*), and legumes are also recorded. In addition to jars, large quantities of cereals were stored in silos such as S.4843 (EB IIIB/EB IVA1), the analysis of which showed that the majority of seeds retrieved belong to barley, emmer, and einkorn (Wachter-Sarkady, in this volume).

Anthrachological analyses carried out by Caracuta and Fiorentino (in this volume) complement the archaeobotanical data. The analysis of charred wooden remains revealed the tree species that were utilized in the manufacture of furniture and precious wooden objects.

Barley seems to have been the principal crop grown in the Eblaite area; a total of 1,875 grains of *Hordeum vulgare* (six-row barley) have been sampled from rooms of the Central Unit West. The large use of barley in Ebla and more generally in the Near East is due to its characteristics, since this is a widely adaptable crop, more tolerant of soil salinity than wheat, and resistant to drought as well as to colder temperatures. Barley was employed for different uses: as a source of fermentable material for beer, as a component of various foods, and as animal fodder.¹¹

Wheats are attested in a lower percentage than barley, especially in the form of emmer (*Triticum dicoccum*) and einkorn (*Triticum monococcum*); pulses (especially lentils and peas) are also present among cultivated species (Wachter-Sarkady, in this volume). Among fruit trees, olives are attested in noteworthy quantities (*Olea europea*),

but compared to the large number of olive tree groves mentioned in the texts (Archi 1991), it seems plausible that most of the processing activities took place outside the city, in farms or villages in the Eblaite territory.¹²

A huge number of wild species (mainly plants with medicinal properties) were retrieved in room L.2890 of Royal Palace G, where cooking activities are documented by the presence of a battery of hearths with pots still in place (see Wachter-Sarkady, in this volume, for a description of this room and an interpretation of the botanical remnants).

The referents of several plant names mentioned in cuneiform texts have been identified (Marchesi, in this volume); furthermore, texts give information about sowing rates, quantities of crops, land management, and the organization of rural territory. Considering the socioeconomic structure of Ebla and the site's extension (ca. 60 ha), it was necessary to cultivate a vast extent of land (as is also testified by textual evidence) in order to sustain the estimated levels of food consumption. From several texts we know that a great amount of land belonged to the king and the royal family, or to other high-ranking officials (Milano 1996, 151).

The data collected suggest the centralization of a great amount of food resources, which were partly processed within the palace by dependent workers in rooms equipped with grinding stones. A large part of the processed food (cereals in particular) was redistributed in the form of rations to dependent workers as wages for their services. The study of cuneiform tablets from the Royal Archives has shed light on the organization of the Eblaite state and the complexity of its social structure. The Small Archive L.2712 refers to activities that took place in the last three years of the city's life; tablets take note of the distributions of foodstuffs to different individuals, such as members of the royal family and the court as well as several palatine supervisors (*ugula*), who in turn compensated the workers organized in work teams (Milano 1990b; Matthiae 2010b, 148–51). Transactions, usually recorded monthly, registered types and quantities of incoming and

outgoing goods as well as their beneficiaries. Besides the records on clay tablets, transactions are testified by the presence of *cretulae* with cylinder seals belonging to palatine officials. The storeroom L.2617+L.2716 attests to this practice; several fragments of jar sealing have been retrieved scattered on the floor, whereas some others were collected in a container for temporary filing (Pinnock, in this volume; see also Mazzoni 1982, 152–53; Matthiae 1995a, 101–3; Peyronel 2006b, 262–66). Several *cretulae* bear the impression of cylinder seals belonging to two officials, *Iptura* (“Ibdula”) and *Rei-Naim* (Matthiae 1995a, 101; Micale and Nadali 2010), whose activities are also recorded in administrative documents (especially in the case of *Rei-Naim*, who was in charge of the distribution of food rations; see *ibidem*). The access to the goods stored was controlled through sealing practices. The storeroom was connected with the Court of Audience, where the majority of economic, political, and commercial activities took place in the presence of the king (Peyronel 2006b, 272). In this regard, it is conceivable that food redistribution was performed by officials in established days or for specific needs; they presumably had access to the jars in the storeroom located at the back of the Court of Audience when the king was present (Mazzoni 1982, 149);¹³ the counting of the delivered goods was registered on tablets that were kept in the nearby Small Archive L.2712 (Milano 1990b, 325).¹⁴

3.2. Animal Husbandry

Animal remains from Ebla and Tell Tuqan provide information about the species that were bred during the EB III-IVB periods at the two sites; in addition, textual information from EB IVA Royal Palace G archives sheds light on husbandry and exploitation of animal resources in Ebla at the time and allows us to crosscheck the zoo-archaeological evidence.

Zoo-archaeological data relating to the EB IIIB period (also named EB IVA1, Mazzoni 2002, 76) have been collected in rooms L.5528, L.5130, and L.7704, all located in the Northwestern Unit of Royal Palace G¹⁵ (Minniti, in this volume), and from levels pertaining to different phases of

the EB III period excavated in the deep sounding that was opened in Area P South at Tell Tuqan (Minniti 2011, 323–24). Data from the two sites show that sheep and goat were the dominant species (88.6 percent at Tell Tuqan, 80.5 percent at Ebla), followed by cattle (10.6 percent at Tell Tuqan, 18.5 percent at Ebla) (Figure 26.6); pigs, hare, and birds are also present in the zoo-archaeological record, but they are very rare.

A similar situation is also found in the EB IVA period (Figure 26.6). The analysis of animal bones from Building P4 at Ebla indicates that sheep and goat continue being the dominant taxa (75.5 percent), followed by cattle (24 percent). Sheep/goat and cattle were slaughtered at young and adult ages; the two peaks of mortality indicate that animals were exploited both for their meat and for their secondary products (see Minniti, in this volume).

For the last phase of the Early Bronze Age (EB IVB), the data coming from Tell Tuqan (Area P South) show a higher percentage of ovicaprines in the assemblage (95.3 percent), whereas cattle seems to be much less abundant (4.7 percent) (Minniti 2011, 323) (Figure 26.6).

Sheep husbandry and wool production were especially important in the Eblaite economy, in which the large-scale production of textiles under the control of central institutions played a significant role (see § 4.1).

Ebla controlled a large number of herds of cattle and sheep/goat. The palace herds were displaced in different villages under the supervision of head shepherds (*ugula mūnsub*). The toponyms related to animal husbandry have been collected by Milano (1996, 169–70). According to Milano, cattle herds were generally kept in centers other than those in which agriculture was practiced; only in the case of major centers (such as Ḫarran and Irritum) both husbandry and agriculture were practiced.

Livestock farming required herds to be carried away during winter in the upland steppe to the east of Ebla, which provided wide areas of grazing land; during the hot season herds were

moved to the villages in the environs of Ebla or to the mountains located to the west. The presence of several wells in the Eblaite *chora* suggests the existence of a network of watering stations for human and animal water supply (Biga 2003b; see also Biga, in this volume), which could indicate preferential routes of transhumance.

The most attested animal species in administrative texts from the EB IVA Royal Archives are cattle and sheep, which are recorded in separate lists. According to the administrative texts, a large number of cattle were directly controlled by the city of Ebla (for instance, TM.75.G.2349, which lists 4,000 heads of cattle with the herdsmen in charge of them; see Archi 1984, 56–63), whereas another substantial source of cattle were the deliveries from different centers, both villages or towns located in the Eblaite territory and foreign cities controlled by Ebla. Some centers provided a great amount of cattle, as in the case of Luatum, for which a delivery of 1,300 heads of cattle to the king of Ebla is recorded (ibidem, 46). Cattle were mostly bred for meat (as shown by the butchery marks on bones; see Minniti, in this volume) and milk products, but also to be used as draught animals. Oxen were also employed to pull chariots during sacred ceremonies, such as the “Ritual of Kingship” (Biga 2009a, 44; Fronzaroli and Catagnoti 1993, 3–52).

Sheep and goat were the most common breeding species; they provided products of different types, such as meat, milk, wool, skins, but also bones or horns, which were used to manufacture tools of various kind, such as awls or needles for weaving (Peyronel 2004, 132–34). The economic importance of sheep/goat is testified also by the texts, which refer to large numbers of sheep flocks and to products obtained from them. Archi (1993c, 47) estimated that the number of sheep directly controlled by the Palace was between 80,000 and 100,000 heads. Additional sheep came to the central administration as tributes paid to the king (Archi 1984, 68).

The main product obtained from sheep was certainly wool, as is witnessed in administrative documents that record monthly releases of wool or tissues from the Palace for various purposes

(Biga 1988; 2011a). Despite the large amount of wool produced in Ebla, however, payments in silver for wool purchased from important production centers such as Mari and Nagar are also attested in Eblaite texts (ibidem, 79).

Finally, although the analysis of the zooarchaeological remains from Royal Palace G brought to the identification of only one bone (humerus) belonging to an equid (coming from room L.7704, which dates to the EB III period; see Minniti, in this volume), administrative texts frequently mention two kinds of equids: the donkey (= *Equus asinus*, written with the sign IGI) and the *kúnga* (BAR×AN) mule (see Conti 1997, 26–32; Archi 1998b, 11–12),¹⁶ which was more exactly an onager (*Equus hemionus*) × donkey hybrid (Postgate 1986).¹⁷ The latter was in great demand in Ebla, and we know from several texts that the main supplier was the city-state of Nagar (Archi 1998b, 8–11). In a text dealing with monthly deliveries of textiles (Biga 2009a, 51) two veterinarians for *kúnga* mules from the city of Nagar are also mentioned. These animals were used to pull chariots of members of the royal family or other high-ranking personages of the Eblaite kingdom, and were purchased by the Palace through payments in silver (Archi 1988b, 100). The high value that was attributed to them is further testified by their use as ceremonial gifts for allied cities (Fronzaroli 2003, 30–34).

4. CRAFTS AND TECHNOLOGY

The items and raw materials found in the Royal Palace testify to the wide range of handicraft activities performed by the Eblaite artisans; according to the picture that emerges from the texts, such objects were produced for inner consumption and redistribution, trade, and gifts exchange, in a complex pattern of spatially diversified circuits (Archi 2003; Dolce 2008a; Mazzoni 2003; Peyronel 2006b; 2012; Pinnock 1991). However, the investigation of the role, importance, and functioning of different sectors of crafts at Ebla rests on inhomogeneous data (Peyronel 2012): textile industry was a fundamental pillar of the state’s economy, as is clearly indicated by the epigraphic evidence, but

the archaeological material only provides us with information on some textile tools and is almost totally silent on the products (only impressions of ropes and textiles on clay seals survive in the archaeological record); metal and stone working are better documented, thanks to a combination of archaeological, archaeometric and epigraphic data; carpentry can be investigated through anthracological analysis and some meaningful pieces of furniture, which were burnt and therefore preserved by the fire; pottery manufacture can be investigated only through finished vessels, which were found in situ in large numbers, whereas no kilns have been found in the Early Syrian town, nor the texts give many useful data.

Archaeometric analyses carried out on several samples of pottery, wooden items, stones, and precious and base metals shed light on technological features and working processes. Data gathered from the palatial context are not sufficient to reach a general overview of ancient crafts at Ebla, as they represent a one-sided view of the relations between the town, its *chora*, and more distant regions under the direct or indirect control of the kingdom.

If we look at the epigraphic information on labor allocation and craft production, we can advance the following observations (Archi 1988a; 1988b; 1992):

- a. The texts that record deliveries of rations (foodstuffs, wool, and clothing) inform us about the different kinds of workers involved in the redistributive system of Ebla. The majority of them appeared to be resident in the administrative center (SA.ZA_x^{ki}) or in the town, but some of them were also detached in the villages (uru-bar = *i-rí-a-tum*; see Fronzaroli 2003, 71).
- b. The personnel at the dependence of the Palace were referred to with general terms such as *ġuruš*, *dam* (male and female workers), simply as “people, personnel” (*na-se₁₁*), or with terms relating to the specialized activity they performed.
- c. Workers were usually organized in groups of different numbers under the control

of overseers (*ugula*). We can distinguish between productive units (*é*, “household of...”) and districts (*ká*, “door of...”), and between small squads of laborers (*é-duru₅^{ki}*) and larger units formed by several work squads under the authority of a functionary (*ir-a-núm*).

- d. There was mobility of specialized craftsmen not only inside the kingdom, but also between Ebla and other states; for instance, we know of Eblaite smiths and carpenters who were sent to Armi, Nagar, Kish, and Mari, and of weavers, smiths, and stonecutters from Mari who were working in Ebla. Beside the exchange of materials and manufactured items, there was a circulation of know-how and technological skills.
- e. From a quantitative point of view, the major groups of specialized male or female workers were weavers, smiths, and carpenters, corresponding to three main sectors of craft production: textile industry, metalworking, and woodworking. The mention of stonecutters (*bur-gul*) and goldsmiths (*kù:dím*) is not frequent, but their activities are widely testified by the semiprecious stones and composite precious items that have been found in the Royal Palace.
- f. The rank and skills of the Eblaite artisans and craftsmen can be inferred from the wide range of materials, objects, and techniques that are mentioned in the administrative documents (Pasquali 2005). Several bronze items, mainly weapons and vessels, together with gold and silver artifacts are listed in the texts, usually followed by their weight (Archi 1985a; Milano 1991). These goods circulated via redistributive (among court members and officials) or gift exchange systems (outside the kingdom) (Archi 2011). The presence of standardized weights and values (Ascalone and Peyronel 2006a; 2006b, 75–124) strongly suggests a careful control of the operational sequence of manufacture, and we are also aware of highly developed alloying techniques based on a precise knowledge of the quality of precious metals used (Archi 1993a).

These epigraphic data might be compared and combined with the archaeological documentation and archaeometric analyses in order to reach a more complete evaluation of crafts in the economy of the kingdom of Ebla. A contextual and distributive analysis of working facilities, raw materials, partially worked items, and by-products of working processes reveal the presence of handicraft activities inside the buildings dating to the age of the Archives. However, no workplaces or industrial ateliers were discovered in the part of the palace brought to light, nor do the two imposing Early Syrian temples found in the town offer any definitive evidence of craft productions. Notwithstanding this negative evidence, the information we have on textile, metal, stone, and wood working allows us to postulate the presence of sectors devoted to craft production inside the public complex. These epigraphic data might be compared and combined with the archaeological documentation and archaeometric analyses in order to reach a more complete evaluation of crafts in the economy of the kingdom of Ebla. A contextual and distributive analysis of working facilities, raw materials, partially worked items, and by-products of working processes reveal the presence of handicraft activities inside the buildings dating to the age of the Archives. However, no workplaces or industrial ateliers were discovered in the part of the palace brought to light, nor do the two imposing Early Syrian temples found in the town offer any definitive evidence of craft productions. Notwithstanding this negative evidence, the information we have on textile, metal, stone, and wood working allows us to postulate the presence of sectors devoted to craft production inside the public complex.

4.1. Textile Industry

The textile industry has been widely studied on the basis of data gathered from the texts (see especially Pasquali 1997; 2005; 2010; Archi 1999b; Sallaberger 2009; Biga 2010d; 2011a) and of iconographic and archaeological evidence (Peyronel 2004; 2007; Andersson et al. 2010; Pinnock 2002).¹⁸

Textual information on textiles comes from the monthly accounts of textiles, the annual accounts

of metals, and the so-called mu-DU texts (records of incoming goods), but also from ritual and religious texts. Most of the data consist of lists of various kinds of textile products that were given out according to the redistributive and gift-exchange systems (Archi 2011).

Wool (siki) was the most used fiber, but linen pieces of textiles (ga da^{túg}) are also attested (Biga 2010d, 156–57; 2011a, 29). The archeobotanical data cannot confirm that flax was cultivated in the Ebla *chora*, but some seeds of *Linum usitatissimum* have been identified in the samples from Royal Palace G (Wachter-Sarkady, in this volume), and linseeds for sowing are recorded in a text from the Royal Archives (see Marchesi, in this volume, s.v. GIB.GARIĜ.TUR, and Appendix A). Animal remains suggest an exploitation of sheep oriented to meat consumption but also to the production of wool: the kill-off pattern shows that several animals were butchered at an old age, between four and ten years (see Minniti, in this volume).

We are informed about several types of textiles of different colors and quality, but there is no consensus among scholars about whether they were clothes or pieces of fabric. Apart from the TÚG.ZI:ZI, which was probably the royal turban (Pinnock 1992; Biga 2010d, 155–56), the other textiles were given to any category of people (ibidem). Textile technology and the textile industry organization can only be reconstructed partially from the epigraphic evidence. The mention of “the house of wool” (é siki) and “the house of the TI-textiles” (é TI^{túg})¹⁹ can be considered as a clue about the presence of warehouses for wool and clothes in the palace, although the original meaning of é siki changed and the term came to indicate a sort of palatial treasury (since the é siki was used to store also precious metals), and in the é TI^{túg} all kinds of textiles were kept (showing that also in this case the literal translation does not correspond to the actual meaning; see ibidem, 153).

Textiles appear to have been manufactured in palatial ateliers (*a₅-za-ru₁₂*) (Bonechi 1999, 21–27), but a domestic production is also attested, and some steps of the production (such as dyeing) were performed outside the town.

Lists of rations for workers mention up to 900 female weavers (túg-nu-tag), but there were also specialized workers for dyeing (DAR and dam-DAR) and for felting (lú túg:du_g). The personnel of the textile sector consisted of both men and women. Men were mostly involved in controlling functions, but also in the physically demanding tasks of fulling and dyeing. Women were responsible for spinning and weaving, and even elite women carried out these functions (Biga 1991, 302–3).

The written evidence also provides the terminology for some textile tools: ^{gi}ba^{la}, “wooden spindle” (and “spindle whorl”?) and ^{gi}gá^{ri}g^u = *ma-za-ù*, “comb” (the wooden comb for combing wool?), both occurring only in a few cases and not in relation with textile manufacture (Biga 2011, 78–79). Moreover, a series of wool measures (na₄ – “KIN” – *zi-ri*) show the adoption at Ebla of a specific metrological system with ratios of 1:2:4 (Zaccagnini 1984).²⁰

The presence in the Royal Palace of several small dome-shaped spindle whorls made of stone, and of bronze and bone awls, pin beaters, and needles can be related to textile manufacture (from spinning to weaving) (Peyronel 2004, 99–145; 2007, 27–30). Their scattered distribution seems to indicate that these implements are probably related to the “common” spinning activity of the members of the palace, and not to the “industrial” textile workshops that are mentioned in the administrative documents. The prevalent use of the horizontal ground loom during the EBA in Inner Syria makes it difficult to locate large textile ateliers inside the public complex; at any rate, the workers under the control of the palatial administration probably wove in open areas of the city. The peripheral location of dyeing and fulling activities also suggests that part of the operational sequence could not be physically centralized.

4.2. Pottery Production

Epigraphic information for pottery production at Ebla is very scanty, thus preventing the possibility to reconstruct the organization of workers and ateliers and their relationship with the central

authority. Some texts contrast potters (báḥar) (Bonechi 2006, 83) with the large groups of smiths, carpenters, fullers, weavers, and dyers working in ateliers controlled by overseers. It is therefore conceivable that specialized potters had a more dynamic and articulated social position into the economic structures of the Ebla kingdom. The Mesopotamian sources of the Ur III period testify that potters worked for the central authority (full-time for a number of months in a year) but also for the private sector, and they received wool, barley, and other products, but also land allotments, in exchange or as wages for their work (Waetzoldt 1971; Steinkeller 1996). The apparent relative independence of potters is also reflected by the spatially diversified pattern of the workshops, which could be located in industrial districts at the periphery or immediately outside the towns, or in villages and hamlets in the countryside.

Without doubt the pottery production during EB IVA is characterized by a high degree of specialization and technical skills, as we can infer from the standardization of vessels, the systematic use of wheel throwing and wheel coiling techniques, the control over fire temperature in the kilns, the use of fine clays and specific treatments to refine outer surface of pots, and the specialized ware production (Mazzoni 2002a).

No kilns of working places for pottery dating to EB IVA have been brought to light at Ebla so far, but a large amount of data come from sites along the Euphrates valley, and new evidence from Tell Tuqan in the Matkh region has been recently published (Peyronel and Vacca in press; see also Peyronel 2011a, 70–77, for kilns discovered at Tell Tuqan dating from EB III).

Notwithstanding this lack of evidence at the site, the manufacturing processes can be investigated through the traces and peculiar features found on the numerous finished vessels that have been retrieved in several rooms of Royal Palace G and Building P4, which testify to the cooking, storage, and consumption of food and liquids (Mazzoni 1982; 1988; 1994a; see also the essays by Mazzoni and Marchetti, in this volume).

Different types of archaeometric analyses have been carried out on several samples of pottery, strongly improving on the traditional visual inspection, in order to define the technological know-how of Eblaite potters, characterize the composition of the fabrics and their provenances, and acquire information for a functional definition of the vessels and their eventual contents (Lazzarini and Colombo 1995; Laneri and Di Pilato 1999; 2000; Santarelli, in this volume).²¹ On the basis of the preliminary results and crossing data from different types of analyses, the following observations can be made:

Manufacture: Porosity analysis and examination of thick and thin sections clearly confirm a difference between fine (Simple and Painted Simple Wares) and coarse wares (storage jars, cooking pots) in the preparation of clay. Most of the samples show a deliberate addition of mineral tempering in connection with the functional use of the pottery (Lazzarini and Colombo 1995, 19–21, figs. 13–14). Mammographic X-ray analyses and examination of thin sections show that rotational devices were used not only in the manufacture of small vessels but also in medium-size jars and larger containers made with the coil-building technique, such as *pithoi*, for body-finishing and trimming or to complete the upper part with the rim (ibidem, 21; Laneri and Di Pilato 1999; 2000; see also Laneri 2009, 84–86, 95–97; *contra* Roux 2008).²² A basalt stone pivot disk with a central conical hollow found at Ebla in a context dating to MB I (ca. 2000–1800 B.C.) (Matthiae, Pinnock, and Scandone Matthiae 1995, 492n455) attests to the use of a type of potter's wheel well known in the Levant since the beginning of the third millennium B.C. (for two complete examples of tournettes with lower and upper disks in basalt from Yarmuth, dating to EB III, see Roux and Miroschedji 2009).²³

Characterization and provenance of the clay: Minero-petrographic analyses that combine examinations of thin and thick sections through polarizing microscope, X-ray fluorescence (XRF), and X-ray diffractometry (XRD) allow us to characterize four main types of fabrics, on the basis of the presence/absence or major/

minor percentage of specific mineral inclusions. The variations in clay composition can be attributed to tempering, and the samples can be related with few exceptions to local sources, which are characterized by alluvial clay (illitic-montmorillonitic).²⁴ New analyses carried out by Santarelli (in this volume) seem to confirm the preliminary evaluation by Lazzarini and Colombo (1995, Groups I–IV), allowing us to distinguish the following groups (Figure 26.7):

1. Basalt-Rich Group (= Group I of Lazzarini and Colombo);
2. Limestone-Rich Basaltic-Bearing Group (= Group III);
3. Limestone-Rich Group (= Group IV);
4. Quartz-Rich Group (= Group II).

These groups can be distinguished in part on the basis of the addition to local clays, which are characterized by sands with disaggregated basalt clast, of a mixture of limestone and crushed alabaster or a mixture of basalt and limestone (ibidem, 21).

Firing temperature: In order to establish the range of temperature reached during firing and to check the results previously obtained through XRD (ibidem, 19), the sampled pot sherds have been subjected to thermogravimetry analysis (TGA) combined with differential scanning calorimetry (DSC) (Santarelli, in this volume, Table 21.2). The formation of gehlenite observed in some samples is proof of a high temperature, since this mineral forms at ca. 850°C, whereas calcite starts to decompose at 700–750°C. The presence of both minerals allows us to suppose that the peak of ca. 850°C was reached but only for a short time. Gehlenite is never detected on cooking pot samples, whereas traces of it have been found in Simple and Painted Simple Wares and in some storage jars sherds.

4.3. Metalworking

Texts dealing with assignments of rations (food and textiles) record up to five hundred smiths (*simug*), in connection with a “house of the smiths” (*é simug*). This suggests that metalworking was organized as a true industrial

activity linked to palatial administration (Archi 1993a, 617). However, it is not clear whether the é simug indicated a specific sector of the palace in which metals were worked and stored; ethnographic and archaeological parallels make it very probable that large-scale metalwork was located in peripheral industrial areas. No tools or by-products of metalworking were, in fact, discovered in the Early Syrian buildings. The only evidence we have is a bun-shaped lead ingot from the courtyard of Royal Palace G, which represents the oldest attestation of this kind of ingot in the Near East (Peyronel 2012, 479, figs. 4–5). From a technological point of view, the texts inform us that bronze (zabar) was obtained by alloying refined copper (a-gar₅, Akkadian *abārum*) and tin (an-na, Akkadian *annakum*); lists of bronze objects contain indications of tin percentages ranging between 8 and 17 percent, roughly matching a tin to copper ratio of 1 to 9, which is the optimal bronze composition (Waetzoldt 1981). This variation can be explained as the result of alloying processes that take into account the different types of items to be manufactured (Archi 1993a, 618–19). The Sumerian term for copper (aruda, uruda, urudu) is attested always alone and never to indicate a metal to be alloyed. Therefore, it has been suggested that the meaning of a-gar₅ is “washed [i.e., refined] copper” (Waetzoldt 1981; Waetzoldt and Bachmann 1984, 4).²⁵

Epigraphic information can be compared with analyses carried out on metal artifacts from Royal Palace G.²⁶ Five objects have been sampled and analyzed through inductively coupled plasma spectroscopy (ICP-OES) (four samples) and X-ray fluorescence (one sample), showing that they were manufactured by using a copper-tin alloy (Felici and Vendittelli, in this volume) (Figure 26.8).²⁷ The percentages of tin are: 2.46 (TM.78.G.283), 7.17 (TM.79.G.144), 7.18 (TM.79.G.143), and 8.06 (TM.79.G.144). While three samples have a tin content fitting a copper to tin ratio of 9 to 1, the fourth bronze item contains a considerably lower quantity of tin, with a ratio of ca. 30 to 1. The elemental composition of TM.83.G.378 obtained by X-ray fluorescence analysis, although imprecise

because of the corrosion of the metal, also shows a very low weight percent of tin. Three objects (TM.78.G.283, TM.78.G.344, TM.79.G.144) contain a low percentage of arsenic (0.5–1% of the total weight). According to Palmieri and Hauptmann (2000, 1264), the presence of arsenic could be ascribed to the remelting of copper and not to an intentional alloying.

Several objects and vessels in gold and silver are attested in the texts (Pasquali 2005, 95–186) in connection with internal and external exchanges of goods, usually with the indication of their weights in silver (see Pomponio 1998), showing a high degree of standardization of the palatial workshops.²⁸ According to Waetzoldt (1985b), the price in silver of golden items indicated in the cuneiform documents directly corresponds to different degrees of purity of the precious metal, and it is possible to infer the ratio between gold and silver and to group the objects into five categories according to their silver content.

Analyses have been made on several gold artifacts coming from the destruction level over the floors in room L.2982 and L.2890 (Figure 26.9); the results indicate that goldsmiths at Ebla used a binary gold-silver alloy and never pure gold.²⁹ In fact, silver is detected in all the samples in proportions ranging from 4 to 29 weight percent, which are lower than those found in the natural alloy electrum (30–45 weight percent). The texts seem to indicate a high degree of control over the production of precious metal objects, which suggests the possibility of an alloying technique, but data from the chemical compositions of the samples cannot be easily matched with the presumed gold “qualities” (Palmieri and Hauptmann 2000, 1269), and only in some cases can hypothetical correspondences be proposed (Felici and Vendittelli, in this volume). However, it seems probable that Eblaite goldsmiths used the silver-gold alloy, since the two precious metals arrived in Ebla from different geographical areas—the silver coming from the Taurus mountains in eastern Turkey, and the gold from sources located either in Egypt or in Middle Asia (at the moment it is not possible to identify the provenance).

In several items additional minor concentrations of copper have been detected, ranging from <1 to 2 weight percent. These low percentages are not sufficient to change the physical properties of the metal or to obtain a reddish color, since it is necessary to add no less than 5 weight percent for it. The presence of copper can be explained in most cases (samples with less than 1 weight percent) as the result of the use of natural gold or gold-silver alloy; in other samples (TM.03.G.868, TM.03.G.771/a, TM.03.G.771/c, TM.79.G.267c = E 63) the weight percent seems to be higher than the one found in nature. According to Palmieri and Hauptmann (2000, 1266–67), the only reasonable explanation for this fact is to ascribe the copper to a recycling of scrap gold contaminated by a solder from copper minerals. The question, however, deserves a more detailed investigation, and analyses on other gold objects are necessary in order to obtain a statistical reliable number of samples.

4.4. Carpentry

Another important sector of palatial Eblaite crafts was carpentry, as revealed by the rations (up to 260) given by the administration to several carpenters (nagar), by the presence of a “house of the carpenters” (é nagar), and by several wooden items (pieces of furniture, containers, and also jewels) listed in the texts, made of boxwood or poplar (𐎗𐎖𐎕𐎗taskarin, 𐎗𐎖𐎕𐎗ildag₄)—both identified in the anthracological remains from Royal Palace G—and other unidentified types of wood (𐎗𐎖𐎕UD, 𐎗𐎖𐎕ti-ḪAR) (Pasquali 2005, 5–8; cf. Marchesi, in this volume). Despite the relatively small number of records of deliveries of timber in the administrative documents, it has been argued that an important sector of Eblaite economy was the overland trade in timber, which was monopolized through the control over the routes that connected the Mediterranean coast with the Euphrates (Steinkeller apud Marchesi, in this volume).

The discovery in a storeroom of Royal Palace G (L.2601) of wooden carvings inlaid with mother-of-pearl, pertaining to a table and the back of a seat, provided evidence of two

masterpieces of Ebla carpentry (Dolce 2006; Matthiae 1985, tables 37, 41–43; 2010b, 167–172). These artifacts inform us on the technical skill of a local atelier under the palatial control in which the wooden pieces were worked and decorated with inlays, and show the intersection of different crafts, as is also confirmed by the use of wooden cores for the composite statuettes and by the decoration of wooden planks in the Ceremonial Staircase (cf. § 4.4).

Furniture is frequently mentioned in the texts, which also convey interesting data on decorations with precious metals and carved, inlaid, and applied figurative elements (Pasquali 2005, 47–57).³⁰ The woods used for the furniture were identified by Caracuta and Fiorentino (in this volume) as fruit trees (a species of *Pomoidaeae*, probably wild cherry) and ash trees (*Fraxinus* sp.). It is interesting to note that these species usually grow in a riverine environment, and they were available during EB and MBA along the Quweiq and in the Matkh depression. By contrast, the trees used as timber for construction (fir and cedar) were imported to Ebla from more distant regions, probably from the Lebanon and Amanus mountains near the Mediterranean coast. The wooden core of a golden statuette from L.2752 is olive wood (*Olea europea*) (see Caracuta and Fiorentino, in this volume).

4.5. Precious Stone and Shellwork

Semiprecious stones are widely attested in the administrative tablets from the Royal Archives as raw materials for the manufacture of jewels, ornaments, and various items, especially lapis lazuli (variously written za:gìn, za-gìn, or gìn(-gìn)) and carnelian (gug_x(GUL)) (Fronzaroli 1996; Pasquali 2005, 8–10).³¹

Ebla obtained lapis lazuli first of all from Mari, with an exchange ratio or “price” of one shekel of silver for three shekels of lapis (Archi 1999c, 151–52). This fact suggests the existence of a trade route for lapis from the southern Mesopotamian cities up the Euphrates (Archi 1985b; Pinnock 1991). In the almost completely excavated Administrative Quarter, a great bulk of unworked precious stones was found, in spite

of the final sack of the palatial building (Figure 26.9). More than 43 kg of raw lapis lazuli have been retrieved, concentrated in the courtyard L.2913 and in the storerooms at the back of the throne room (L.2982) (Pinnock 1986a; 1987; 1988; 2006b). In the latter room the precious material was also checked by the administrative bureaucracy of the palace before being delivered to stonecutters or to merchants, as testified by a wooden balance beam associated with a conical limestone pierced weight found in situ on the floor near several pieces of lapis (Ascalone and Peyronel 2006a, 53, figs. 9–10; Peyronel 2006b, 269–70; 2011b, 110–11). The lapis was cut in small pieces roughly worked; sometimes cut marks and grooves made with a chisel are visible on the surface of the bigger blocks. The weights seems to cluster around 0.5 kg (with specimens ranging from 100 g up to 1 kg); it is probable that most of the lapis was traded in preworked pieces of ca. 1 mina.

The XRF analyses carried out on some samples confirm the identification of the semiprecious stone, which is composed of lazurite of good quality, with inclusions of pyrite and chalcopyrite. However, a precise source identification is not possible, and only a hypothetical provenance from the Badakhshan mines in Afghanistan has been proposed (Pinnock 1988, 108–9).

Stones not locally available were also imported to Ebla to be used in the manufacture of balance weights, which were indispensable to reach the maximum level of precision with the small two-arm balances that were used for weighing precious metals. The weights needed to correspond to metrological units of a coherent weight system, and therefore their manufacture was decisive in order to obtain an efficient tool. Iron oxide stones and in particular hematite and goethite were imported to Ebla during EB IVA, where they were shaped into small barrel-shaped, spherical, or hemispherical balance weights (Ascalone and Peyronel 2006b, 55–57). The raw material probably comes from the Taurus mountain and attests to a northern inland route connecting Ebla with Cappadocia and Anatolia, although sources of hematite have been identified in northeastern

Syria near Tell Banat/Tell Bazi on the Euphrates, and iron oxides deposits were also located in the coastal chains of Syria and Lebanon and in Sinai-Negev (see de Vries-Melein et al. 2010). Observations with the stereomicroscope and diffractometry analyses carried out by the lab of the Department of Earth Sciences of the Sapienza University of Rome (Prof. V. Ferrini) have shown that EB IVA weights are made of hematite and goethite (59 specimens out of 79 weights, or 67 percent), and magnetite has been found as minor component only in few specimens. Three main varieties can be recognized: a compacted microgranular hematite of black color, a brown-reddish mammellonar layered hematite, and a dark gray lamellar one. The last type is very rare, whereas the first is a hematite of good quality that probably came from Anatolia; the mammellonar variety may derive from sources located in the coastal western region, since it is not attested in eastern Syria and northern Mesopotamia.

Quartz, rock crystal, and unworked obsidian have been also found in the Administrative Quarter, albeit these materials are rarely attested in the finished artifacts found so far (Matthiae, Pinnock, and Scandone 1995, 280n38).³²

Stones and semiprecious stones, such as lapis lazuli, steatite/chlorite, marble, limestone, alabaster, shell, mother-of-pearl, carnelian, and jasper were worked together with precious metals, such as gold and silver, to produce seals, inlays, and parts of small figurines (used in composite panels, friezes, standards, and architectural decorations), beads, amulets, and furniture (*ibidem*, nos. 20–36, 63–121; Matthiae 2009a; 2010b, 152–67). All these data point to the existence of specific storerooms in the Administrative Quarter in which the precious items and materials were kept. In these rooms weighing operations were likely performed.

Few metal and stone tools (drill heads, tweezers, and chisels) come from the Palace: their scattered distribution makes it impossible to identify particular rooms as the workshops of stonecutters or goldsmiths. However, such an identification has been suggested for a small rectangular room in Building P4—a multifunctional complex

partially excavated at the foot of the northern Acropolis slope (Marchetti and Nigro 1995–96; see also Marchetti, in this volume). In this room, about a hundred pieces of inlay of different materials, silver and gold revetment sheets, and some tools have been found, which point to a function linked to the assembling of precious materials, if not to their direct manufacture.

Generally speaking, specialized handicraft activities related to precious stones, gold, silver, and woods were strongly interconnected. Some kinds of high-value textiles were also decorated with gold and silver, as proven not only by the texts, but also by the exceptional discovery of pieces of gold revetments made of woven thin gold wires in the Administrative Quarter of the Royal Palace (Matthiae 2006b, 455, fig. 8; Biga 2010d, 159).

The written documents never describe in detail the process of manufacture of precious objects, and the generic term usually employed to indicate the production of an item by the craftsmen is *kin₅-ak* (“to perform a work, to manufacture”). However, some interesting information regarding specific techniques or methods of decoration are provided by such terms as *zi-ba-du* or *zi-bù* (“plating”), *ne-zi-mu* (“lamination”), or by verbal expressions that indicate the assembling of different materials for producing composite objects (Pasquali 2005, 12–14, 83–94). These terms hint that the working of precious metals, wood, and semiprecious stones was concentrated in the same workshop.³³

NOTES

- 1 Peyronel has written § 4, Vacca §§ 2–3. The transliteration of the Sumerian and Semitic terms follows the reading proposed by Marchesi.
- 2 Two or three superimposed floors dating to the EB IVA period have been recognized in the West Unit of the Central Complex (Matthiae 1993a, 619; 2010b, 74).
- 3 For a description and interpretation of Royal Palace G, see Matthiae (1982b; 1995a; 2008a; 2010a; 2010b; see also Matthiae, in this volume). For a methodological approach to the study and interpretation of buildings and construction techniques, see Margueron (1982; 1985; 1986), Aurenche (1977; 1981), Moorey (1994), Sauvage (1998), Pfälzner (2001), Liberotti and Quaresima (2010), Alvaro (2010), Alvaro et al. (2010), and Anastasio (2011).
- 4 Foundations and basements are generally not higher than 1 m, and their main function was the isolation of mud-brick walls from damp and water lift (Aurenche 1981, 124).
- 5 According to Sauvage (1998, 18), the soil utilized for bricks was generally taken near the construction place, but also carefully selected; in fact, in several sites walls are built with mud bricks made of different kinds of soil: a good quality earth (taken on the site’s proximity) and an “archeological earth” (available on site), which is of poorer quality and, in architectural terms, more fragile (usually containing a small percentage of pottery fragments). The two qualities of mud bricks are alternated in order to obtain a solid construction, economizing on production work.
- 6 In mud structures the proportion of clay is generally low; main components are earth, gravel, silt, and straw. The addition of vegetal and mineral tempers (mainly sand and straw) in the dough makes the bricks more resistant to tensile strength and favors thermal exchange (Aurenche 1981, 46). According to Sauvage (1998, 19) The ideal composition of the brick is 70 percent sand, 15 percent silt, and 15 percent clay, although these proportions were never attained in antiquity.
- 7 Bricks were usually manufactured during the dry season, approximately between May and June, in order to ensure a homogeneous and progressive drying; a large amount of straw, derived from the harvest, was also available during this season (ibidem, 17; Anastasio 2011, 38).
- 8 For the use of wood in carpentry, see among others Aurenche (1981, 73–80), Moorey (1994, 360–62), and Anastasio (2011, 52–55, 131–32, with relative bibliography).
- 9 See also Steinkeller (1987) for the mention of carpenters in texts dating to the Ur III period in southern Mesopotamia.
- 10 The Matkh likely experienced also irrigated agriculture: see Arnoldus-Huyzendveld, in this volume.
- 11 Note *še gu₄*, “barley/grain for oxen,” in TM.75.G.10146 re. vii 5 (reference courtesy of Marchesi; the text will be published by Pomponio in ARET XV 2). See also Milano (1987a, 191–92; 1996, 139n31) and Conti (1997, 28). For the use of bar-

- ley as fodder see also Miller (1997, 96), Sallaberger (1996), Widell (2003, 724–29), and Cooper (2006a).
- 12 Milano (1996, 158–68) lists the names of the villages located around Ebla in which agricultural activities were performed.
 - 13 In the first three meters of the storeroom L.2617 were stacked several jars and only one bowl, probably utilized as a transfer container.
 - 14 The Small Archive L.2712 is characterized by the presence of a homogeneous batch of documents (in terms of contents and editorial point of view), and can be attributed to a specialized accounting office.
 - 15 For the description of these rooms lying beneath Palace G floors, see Matthiae (1993a, 618–24).
 - 16 According to Conti (1997, 32), there was also a third species of equid, whose name was written either IGI.NITA.U₅ or simply U₅. However, since U₅ means “to ride,” the IGI.NITA.U₅ was more likely a male donkey (IGI.NITA) trained for riding (suggestion courtesy Marchesi; see also Archi 1998b, 12).
 - 17 Such an identification is also supported by zoo-archaeological data from Umm el-Marra. Analyzing thirty-four complete equid skeletons found buried in the Early Bronze Age elite funerary complex on the top of the acropolis of Umm el-Marra, Weber (2009, 33–35) identified hybrids of this kind. In Weber’s opinion (ibidem, 33), these equids were larger than donkeys and more robust than onagers, mixing some characteristics peculiar to the two taxa. The high value of these hybrids is further testified by the fact that at Umm el-Marra they were buried within the elite mortuary complex (Schwartz et al. 2006, 624–25; Schwartz 2009, 22–25; Schwartz et al. 2012, 164).
 - 18 Peyronel has been responsible on behalf of the Italian Archaeological Expedition at Ebla (MAIS) for the collaboration agreement made in 2005 with the Danish National Research Foundation’s Centre for Textile Research (CTR) and its research program *Tools and Textiles: Texts and Contexts* (see Andersson et al. 2010, 159–160; http://ctr.hum.ku.dk/tools/toolsreports/Ebla_Technical_textile_Tools_Report.PDF).
 - 19 The exact meaning of TT^{nis} is unknown; see, most recently, Civil (2008, 16, 94).
 - 20 These measures may be linked to a specific weight system for wool based on a mina of ca. 660 g (documented by some stone weights), whereas the metrological units adopted for exchanges and economic transactions followed a sexagesimal system with a shekel of 7.8 g, a mina of ca. 470 g, and a talent of ca. 28 kg (see Ascalone and Peyronel 2006b, 78–80).
 - 21 Forty EB IVA-B sherds have been sampled and analyzed with different methods by Lazzarini and Colombo (1995); twenty-three EB III-IVA pots have been analyzed through X-radiography by Laneri and Di Pilato (1999); and a new project of archaeometric analysis on EB III–IV pottery from Ebla and Tell Tuqan has begun as part of the Ebla Chora Project (see Santarelli, in this volume, where are reported the preliminary results on nine samples from pottery coming from Royal Palace G at Ebla and eight samples on EB III vessels retrieved in the sounding in Area P at Tell Tuqan).
 - 22 Twenty-one small and medium-sized pots and two storage jars dating from EB III and EB IVA and twenty vessels dating to MB II have been analyzed through X-radiography: the presence of inclusions and clay particles along oblique lines or in a continue spiral distribution demonstrates the introduction of the potter’s wheel during EB III for the manufacture of small bowls and its systematic use for bowls, beakers, and small jars during EB IVA–B. On the contrary, peculiar features visible on the X-ray images, such as inclusions and pores along horizontal lines and linear thick (= radio-opaque) anomalies, show that medium jars and storage jars were made with a coil-building technique or with a hybrid technique that combined wheel throwing and coil building (wheel-coiling technique).
 - 23 Whether this type of potter’s wheel was adopted in order to produce small and medium-sized vessels with a wheel-throwing technique or whether its introduction was due to the need to help the manufacture of pots by using a hybrid wheel-coiling technique is a matter of discussion among scholars; the evidence obtained from archaeometric analyses has also been interpreted in different ways: see for example Roux and Miroshedji (2009, 170–71) and Laneri (2009, 77–93).
 - 24 According to Lazzarini and Colombo (1995, 21), only five samples show a petrographic and geochemical compositions that could indicate provenance from a different clay source and, as a consequence, suggest an interpretation of the sherds as belonging to imported vessels (in three cases, this is confirmed by typological parameters). It is interesting to note that the composition of two of those samples is similar to a group of sherds found at Mishrife/Qatna and dating to the same period (see Maritan et al. 2005, 735, fig. 4).
 - 25 The Sumerian term a-gar₅ means “lead” in Mesopotamia, but in Ebla it was used to denote copper, as

is indicated by its occurrences together with the term for “tin,” the other component of the copper-tin alloy called bronze (zabar).

- 26 The number of EB IVA samples is small in comparison with more than seventy MB metal artifacts analyzed. A first group of metals (copper/bronze, gold, silver, iron) has been sampled between 1995 and 2000 by the CNR Lab of Rome and by the Lab of the Bergbau Museum of Bochum and analyzed through ICP-OES (copper/bronze) and also through EDS-SEM (gold) (Palmieri and Hauptmann 2000). During 2009 and 2010 new analyses (on ten golden objects, twenty-five silver objects, and nineteen copper/bronze objects dating from EB and MBA) have been carried out through X-ray fluorescence by the Lab of archaeometry and nondestructive analysis at the Department of Energy Technology, the Sapienza University of Rome (Peyronel 2012, 478–79; Felici and Vendittelli, in this volume).
- 27 ICP-OES: TM.78.G.283 (axe), TM.78.G.344 (toggle pin), TM.79.G.143 (dagger), TM.79.G.144 (spear head); XRF: TM.83.G.378 (dagger).
- 28 The ratio of silver to gold at Ebla seems to be 5 to 1, although it fluctuated arriving at 2.5 to 1. The reason of these changes could be ascribed to different factors, such as availability of gold, quality of the precious metal, and incoming of gold in connection with specific events (see Pomponio 1998, 127–33).
- 29 Ten items have been analyzed through XRF (Felici and Vendittelli, in this volume): six gold

sheets (TM.03.G.771a, c, d, and i, TM.03.G.797, TM.03.G.868), three fragments of arms of composite statuettes (TM.03.G.600, TM.03.G.767, TM.03.G.785), and a decorated disc (TM.03.G.795). Four gold sheets (TM.89.G.267a-d) have been analyzed with SEM-EDS and two of them also through ICP-OES (see Palmieri and Hauptmann 2000, 1261).

- 30 The epigraphic documentation attests beds (^{ēis}NÁ), thrones (^{ēis}“uštin”), stools and footstools (^{ēis}šilig), and tables (^{ēis}banšur).
- 31 The identification of many stones and stone objects cited in the texts is a matter of debate among scholars; see, for instance, the case of the stone si₄(-si₄), variously interpreted as carnelian of pale red color, coral, or agate (Pasquali 2005, 10 and n44).
- 32 Pasquali (ibidem, 67–71) proposed the meaning of “rock crystal” for the term *nab_x-hu*.
- 33 According to Archi (1993a, 617), the rare occurrences of goldsmiths (kù-dím) in the texts could be explained with the facts that the simug (“the smiths”) worked both base and precious metals. However, albeit it is true that some simug also received and worked silver and gold, it appears more likely that the production of bronze/copper objects took place in workshops located outside the public complex, in the industrial districts, whereas the manufacture of small polymaterialic precious artifacts was performed under the control of officials and overseers in specific sectors of the Royal Palace.

ARCHAEOBOTANICAL SAMPLES (TAXA) (Wachter-Sarkady, Chapter 23)	TEXTUAL EVIDENCE (Marchesi, Chapter 14)	MODERN AGRICULTURE (Rossi, Ventura, and Vignudelli, Chapter 19)
<i>Triticum monococcum</i> (einkorn)	KAL	x
<i>Triticum dicoccum</i> (emmer)	zíz	
<i>Triticum aestivum/durum</i> , <i>Triticum compactum</i> (wheat)	gìb	x
<i>Hordeum vulgare</i> (barley)	še	x
<i>Pisum sativum</i> (field/garden pea)	GÌB.GÛNU.TUR ^{gur}	
<i>Lens culinaris</i> (lentil)	GÌB.TUR(.TUR)	x
<i>Linum usitatissimum</i> (flax)	GÌB.GARIĜ.TUR	
<i>Olea europaea</i> (olive)	ĜIŠ.Ì(.ĜIŠ)	x
<i>Vitis vinifera</i> (grapevine)	^{ēis} ĝeštin	x

Table 26.1. Compared archaeobotanical (Wachter-Sarkady, Chapter 23), textual (Marchesi, Chapter 14), and modern data (Rossi, Ventura, and Vignudelli, Chapter 19).



1



2



3



4

Figure 26.1. 1. Mud bricks walls; 2. Staircases (Monumental Stairway); 3. Wells (Court of Audience L.2752); 4. Wooden beams (collapsed on the floor of the Treasury Room L.2982).



Figure 26.2. Restoration of Royal Palace G walls.



Figure 26.3. Mud-bricks of the Ceremonial Staircase, view from south-east.



Figure 26.4. Lime plaster applied on mud-brick walls (Royal Palace G, Achive L.2769).



Figure 26.5. Benches furnished with grinding stones (Royal Palace G, room L. 3914).

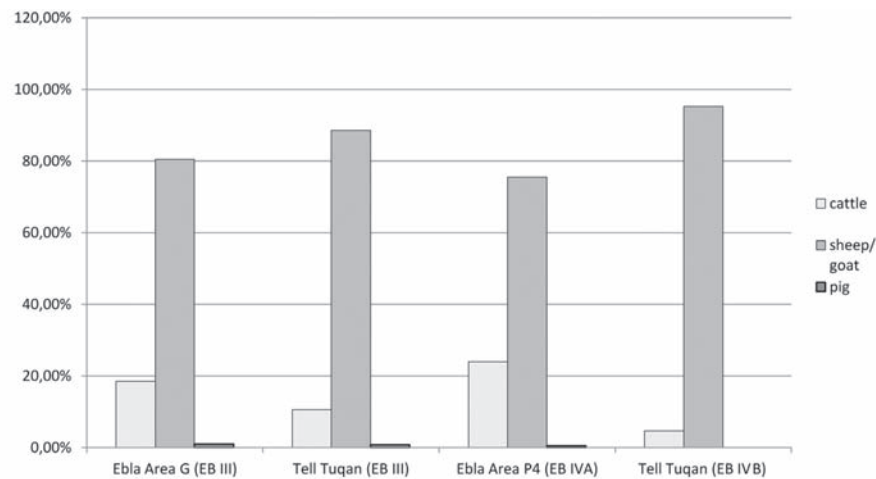


Figure 26.6. Frequency of the domestic species at Ebla and Tell Tuqan during the EB III-IVB (from Minniti, in this volume).

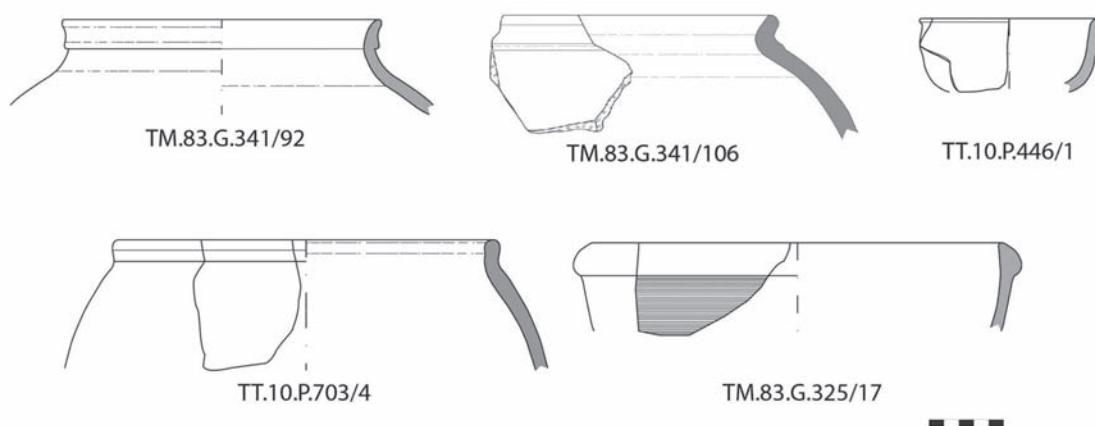


Figure 26.7. Characterization analysis of EBA pottery from Ebla and Tell Tuqan. Basalt-Rich Group: TM.83.G.341/92; Limestone-Rich Basaltic-Bearing Group: TM.83.G.341/106, TT.10.P.446/1; Limestone-Rich Group: TT.10.P.703/4; Quartz-Rich Group: TM.83.G.325/17 (see Santarelli, in this volume, Figures 1–3).

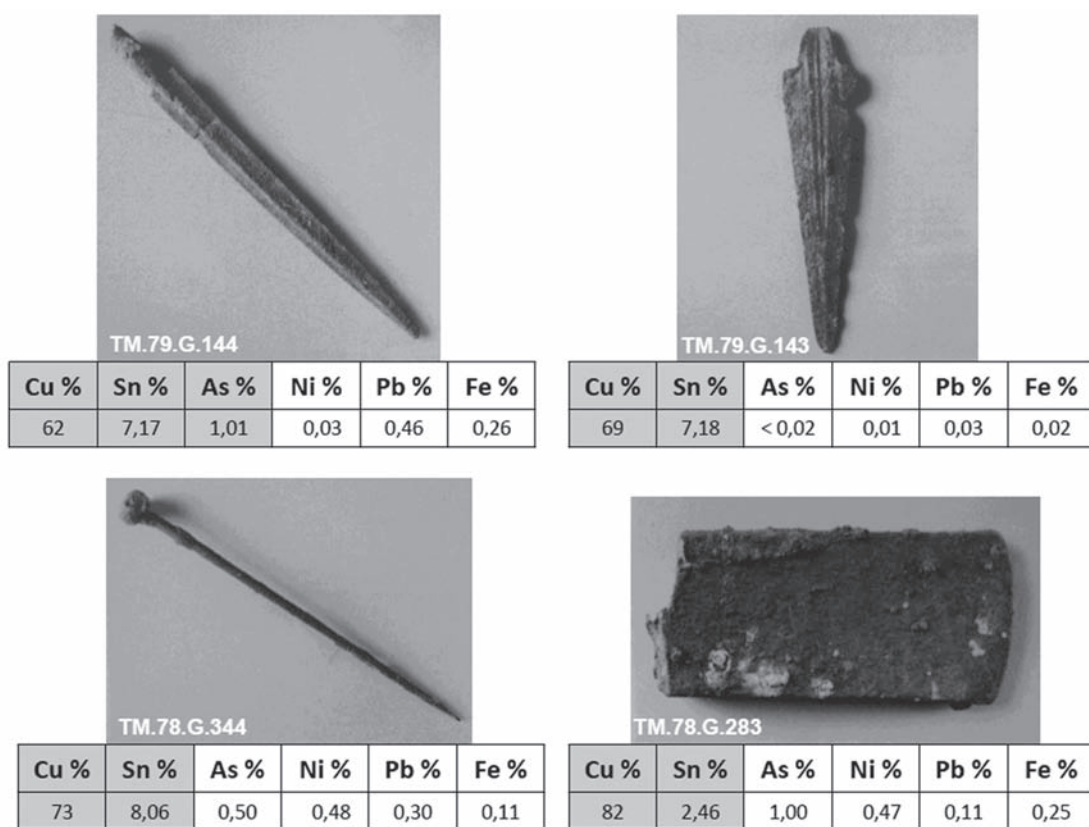


Figure 26.8. Analyzed bronze objects from Royal Palace G (EB IVA) (see Felici and Vendittelli, in this volume).

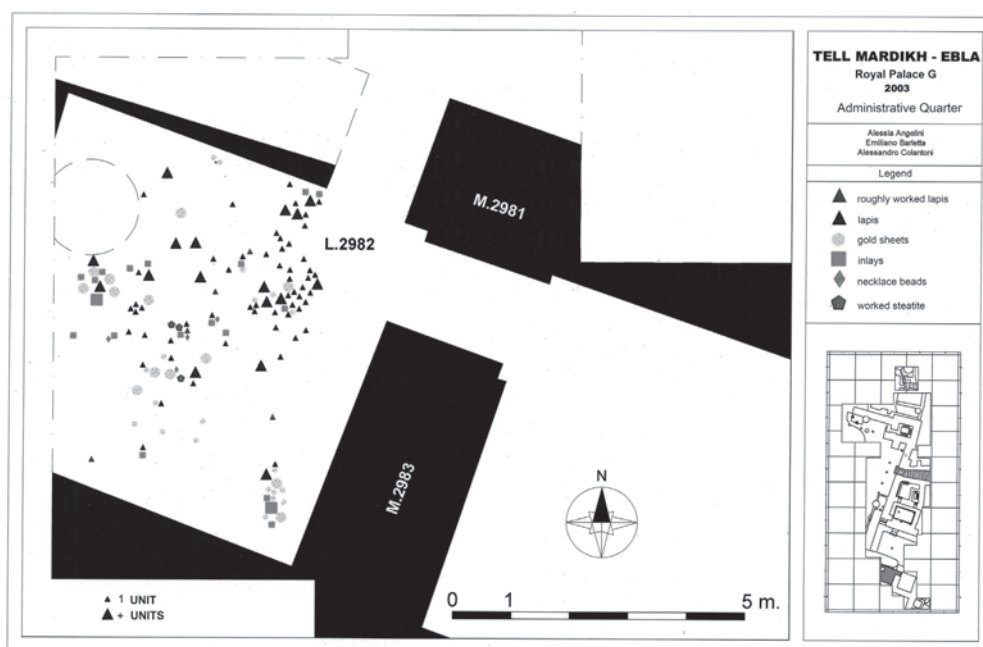


Figure 26.9. Distributinal chart of findings in the storeroom L.2982, Royal Palace G (EB IVA).

CHAPTER 27

JUST AT THAT TIME

^{14}C Determinations and Analysis from EB IVA Layers

L. Calcagnile, G. Quarta, and M. D'Elia

1. INTRODUCTION¹

Organic samples selected from different archaeological contexts of the Tell Mardikh/Ebla archaeological site were submitted to AMS (Accelerator Mass Spectrometry) radiocarbon dating at CEDAD (Centre for Dating and Diagnostics), University of Salento. The samples were selected from different contexts from Royal Palace G, all related to the fire that led to the destruction of the palace. This paper presents the general principles of the radiocarbon dating method, the chemical procedures used for preparing the samples, and the details of the AMS measurements and discusses the results obtained from the analysis.

2. RADIOCARBON DATING AND EXPERIMENTAL SETUP AT CEDAD

CEDAD is a multidisciplinary research centre established at the University of Salento in 2001. The centre hosts an accelerator laboratory and chemical laboratories for samples processing and is involved in fundamental and applied researches in different fields, including radiocarbon dating, cultural heritage diagnostics, environmental monitoring, and material sciences. The accelerator laboratory houses an electrostatic Tandetron-type accelerator (Mod. 4130 HC from High Voltage Engineering Europa) with a maximum terminal voltage of 3 MV and equipped with six different experimental beamlines for AMS

radiocarbon dating, AMS analysis of rare cosmogenic and anthropogenic nuclides, IBA (Ion Beam Analysis) both in vacuum and in air, high energy ion implantation, and nuclear microprobe ([Figure 27.1](#)). In the cultural heritage field, the centre is a well-established facility for radiocarbon dating and for the compositional analysis of materials by means of non-destructive nuclear spectroscopic techniques (IBA) such as PIXE (Particle-Induced X-Ray Emission), PIGE (Particle-Induced Gamma Ray Emission), and RBS (Rutherford Backscattering Spectrometry). In particular, an external-beam setup has been developed and is usually employed in the diagnostics of cultural heritage artifacts: the high-energy ion beam probe, produced with the accelerator (typically protons with energies in the 3–4 MeV energy range), is extracted in air through a thin window and sent onto the sample, which is kept in air at atmospheric pressure. The features of this approach, namely the possibility to analyze samples without restriction related to their shape and dimensions and the reduction of beam-induced damage, make it ideal for a non-destructive analysis of cultural heritage objects. All these advantages have been exploited in different applications at CEDAD, such as the chemical analysis of obsidians from southern Italy and Anatolia for provenance-tracing studies (Butalag et al. 2008), the study of the uptake of heavy elements in medieval fossil bones (Quarta et al. 2008), and the analysis of Bronze Age golden discs (Butalag et al. 2005).

2.1. Radiocarbon Dating: Basic Principles

Radiocarbon (^{14}C) is the radioactive isotope of carbon, produced in the upper atmosphere by the interaction of cosmic rays with atmospheric nitrogen. Once produced it is soon oxidized into carbon monoxide (^{14}CO) and then carbon dioxide ($^{14}\text{CO}_2$); it then mixes with the two stable forms ($^{12}\text{CO}_2$ and $^{13}\text{CO}_2$) and enters different terrestrial reservoirs such as the hydrosphere and the biosphere (through photosynthesis and the alimentary chain). As the results of these processes, all the living organisms exhibit a radiocarbon concentration in their tissues that reflects the current atmospheric value, corresponding to a $^{14}\text{C}/^{12}\text{C}$ ratio of 10^{-12} . This is because a steady-state equilibrium condition is achieved when the radiocarbon released into the environment through biological processes is compensated by the intake through photosynthesis (for vegetal organisms) or the alimentary chain. When this equilibrium is broken by the organisms' death, the radiocarbon concentration starts to decrease following the exponential radioactive decay law with a half-life of 5730 years. The dating method is thus based on the measurement of the residual radiocarbon concentration in the sample material, which allows to calculate the time elapsed since the death of the organism. It is worth noting that the actual application of this method is made more complex by several effects that have to be taken into account and that require a correction of the dates obtained, such as isotopic fractionation occurring during biological activity and the fluctuations of the atmospheric radiocarbon concentration resulting from complex phenomena like the variations in earth magnetic field, solar activity, and in the relative proportion of the different radiocarbon reservoirs.

From an experimental point of view, the main difficulties of this method are related to the extremely low concentration of ^{14}C atoms in the samples, which makes their observation very complex. Measurement can thus be obtained by two methods: conventional β counting and accelerator-based techniques. In the conventional β counting techniques (GPC: Gas Proportional

Counting and LSC: Liquid Scintillation Counting), the radiocarbon concentration is indirectly determined by measuring the β particles emitted by radiocarbon during its decay. In a very simplified way we can say that the higher the radioactivity and the ^{14}C concentration, the younger the sample. The main disadvantage of this approach is that, because of the very low ^{14}C concentration, the achievement of reasonably precise age estimation requires large amounts of material and long measurement times. These limitations were largely overcome with the introduction, at the end of 1970s, of AMS (Accelerator Mass Spectrometry). This technique allows the measurement in few minutes of samples of masses below 1 mg (and even in the nanogram range). In AMS, ^{14}C atoms are directly measured by extracting the carbon atoms from the sample material; these are then separated according to their masses and energies from the interfering ions by using particle accelerators and complex magnetic and electrostatic analyzers.

Nowadays the radiocarbon dating method is a well-established methodology for absolute dating in different fields, and in particular it plays a fundamental role in the archaeological field in the analysis of contexts. In recent years important advancements have been achieved in the preparation and calibration of samples. In terms of preparation, different techniques have been developed for the quantitative determination of the preservation status of the samples by using independent techniques such as FTIR (Fourier Transform Infrared Spectrometry) for bone collagen (Gianfrate et al. 2007) and Raman spectroscopy for charcoal. At the same time, new methods have been developed for the analysis of non-standard samples such as cremated bones (Lanting, Aerts-Bijma, and van der Plicht 2001) or mortars (Pesce et al. 2009).

In terms of calibration, if the "dendrochronological" part of the calibration curve spanning the last 13,000 years is well established and accurate, a major step forward has been done in 2009 with the introduction of an internationally accepted calibration curve valid for the last 50,000 years,

and thus covering the whole radiocarbon dating range (Reimer et al. 2009).

2.2. Radiocarbon Experimental Setup at CEDAD

The AMS radiocarbon dating setup at CEDAD can be described as formed by a ion source and a low- and a high-mass spectrometer connected by the Tandetron accelerator. Conceptually it can be seen as formed by a series of “filters” or “traps” used to purify the beam extracted from the samples from unwanted particles, to separate the different carbon isotopes, and to detect and measure them.

The ion source (Mod. HVEE 846B) is a sputtering source in which a negative carbon beam is produced from the solid graphite target by sputtering it with 7 keV Cs⁺ ions. The produced ion beam is then extracted, in the negative charge state, at an energy of 35 keV and injected in the following low-energy mass spectrometer. The ion source also supports unattended operations by using an automatic loading and unloading system, which allows to measure the fifty-eight samples that can be loaded in the source carousel wheel in a fully automatic way.

The ion beam extracted from the ion source is first analyzed in the low-energy mass spectrometer, which consists of two dispersive elements: a 54° ESA (Electrostatic Analyzer) and a 90° injection magnet (Figure 27.2). These two elements are used, respectively, to carry out a first energy-to-charge and mass-to-charge analysis of the beam in order to remove particles having the wrong energy and to inject in the accelerator only beams with the right 12, 13, and 14 amu masses.

In the accelerator the particles, injected in the negative charge state, are first accelerated towards the terminal kept at a voltage of 2.5 MV, where they interact with low-pressure Argon gas which is recirculated in a small 13 mm diameter tube (stripper). The interaction of the fast particles with the argon atoms induces the loss of electrons from the injected ions, which are then converted to positively charged ions (*charge stripping*). The positive ions are then pushed away by the

positive terminal towards the accelerator exit, further increasing their energy. The stripping process is in fact one of the key aspect in AMS radiocarbon dating since it allows to get rid of the molecular isobars of the carbon ions (such as ¹²CH⁺, ¹³CH⁺, ¹²CH²⁺), which are produced in the ion source, have the same mass and charge of the wanted carbon ions (¹³C and ¹⁴C), and are thus undistinguishable from them in the low-energy spectrometer. The electron stripping weakens the molecular bonds of the isobars inducing their breakdown into fragments having different energies than the wanted monoatomic carbon ions.

The function of the high-energy spectrometer is thus to separate the molecular fragments from the “pure” carbon ions, to separate the three carbon isotopes, and to detect them. In the CEDAD system this is achieved by using a 110° magnet, which is used to separate the three carbon masses. The two stable isotopes ¹²C and ¹³C are measured soon afterwards using two Faraday cups, while the ¹⁴C beam is measured with a high-sensitivity gas ionization chamber after passing through two additional filters consisting of a 33° ESA and a last 90° magnet.

In terms of performance, the system allows the measurement of the radiocarbon age with a margin of uncertainty of 0.3–0.5 percent (corresponding to absolute uncertainty of 30–40 years in the radiocarbon age) and with a high degree of accuracy, which is monitored by analyzing standard samples of certified radiocarbon ages.

3. RESULTS

Sixteen samples from Early Bronze IVA layers of Ebla were selected and submitted to radiocarbon dating at CEDAD (Fiorentino et al. 2008). Table 27.1 lists the submitted samples together with the indication of the species identified through paleobotanical analysis. It can be noted that all the samples belong to short-living species, since this allows to avoid the so-called “old wood effect,” that is, a significant difference between the age of the samples and the age of the corresponding

SAMPLE ID	CEDAD CODE	CONTEXT	SPECIES	Radiocarbon Age (BP)	CALIBRATED AGE (95.4 % PROBABILITY) (CAL B.C.)
TM.88-SAMPLE 1	LTL12319A	Royal Palace G EB IVA	<i>Hordeum vulgare</i>	3927 ± 35	2561 (3.8%) 2536; 2492 (91.6%) 2297
TM.88-SAMPLE 3	LTL12320A	Royal Palace G EB IVA	<i>Hordeum vulgare</i>	3855 ± 45	2467 (95.4%) 2202
TM.89-SAMPLE 50/68	LTL12322A	Royal Palace G EB IVA	<i>Hordeum vulgare</i>	3809 ± 45	2459 (95.4%) 2136
TM.89-SAMPLE 50/102	LTL12323A	Royal Palace G EB IVA	<i>Cerealia</i>	3942 ± 40	2569 (15.4%) 2517; 2500 (80.0%) 2299
TM.89-SAMPLE 50/106	LTL12324A	Royal Palace G EB IVA	<i>Cannaceae</i>	3857 ± 45	2466 (95.4%) 2203
TM.90-SAMPLE 69	LTL12326A	Royal Palace G EB IVA	<i>Olea europaea</i> stone	3833 ± 45	2462 (91.1%) 2196; 2171 (4.3%) 2146
TM.90-SAMPLE 90	LTL12327A	Royal Palace G EB IVA	<i>Hordeum vulgare</i>	3918 ± 35	2547 (0.6%) 2541; 2489 (94.8%) 2292
TM.90-SAMPLE 135	LTL12328A	Royal Palace G EB IVA	<i>Hordeum vulgare</i>	3885 ± 40	2472 (89.9%) 2278; 2251 (3.8%) 2229; 2221 (1.6%) 2210
TM.90-SAMPLE 123	LTL12329A	Building P4 EB IVA	<i>Hordeum vulgare</i>	3872 ± 35	2467 (88.3%) 2278; 2251 (5.0%) 2229; 2221 (2.1%) 2210
TM.90-SAMPLE 130/E	LTL12330A	Building P4 EB IVA	<i>Olea europaea</i> stone	3800 ± 35	2403 (1.7%) 2381; 2349 (93.1%) 2135
TM.90-SAMPLE 144	LTL12331A	Building P4 EB IVA	<i>Hordeum vulgare</i>	3798 ± 40	2437 (1.2%) 2420; 2406 (2.6%) 2377; 2350 (88.5%) 2131
TM.90-SAMPLE 188	LTL12332A	Building P4 EB IVA	<i>Olea europaea</i> stone	3819 ± 35	2457 (4.5%) 2418; 2407 (5.0%) 2376; 2351 (78.3%) 2192
TM.90-SAMPLE 190	LTL12333A	Building P4 EB IVA	<i>Hordeum vulgare</i>	3858 ± 35	2463 (80.3%) 2272; 2258 (15.1%) 2207
TM.90-SAMPLE 221	LTL12334A	Building P4 EB IVA	<i>Hordeum vulgare</i>	3863 ± 45	2466 (95.4%) 2205
TM.90-SAMPLE 222	LTL12335A	Building P4 EB IVA	<i>Hordeum vulgare</i>	3840 ± 35	2460 (95.4%) 2201
TM.90-SAMPLE 130/E	LTL12336A	Building P4 EB IVA	<i>Hordeum vulgare</i>	3893 ± 35	2473 (94.5%) 2286; 2247 (0.9%) 2236

Table 27.1. Summary of analyzed samples, measured radiocarbon ages, and calibrated time ranges.

level. This is in particular the case of samples belonging to long-living vegetal species such as trees, as a significant difference can exist between the age of the dated annual rings and the year in which the tree was cut.

3.1. Chemical Processing and AMS Measurements

The submitted samples were chemically processed in the chemical laboratories at CEDAD. The samples were first preliminarily observed with the optical microscope in order to remove macroscopic contaminants and to do a qualitative assessment of their preservation status. They were then submitted to alternate acid-alkali-acid treatment in order to remove any source of contamination such as humic substances (D'Elia et al. 2004). The purified sample material was then vacuum-sealed in quartz tubes together with copper oxide and silver wool. The tubes were then heated at 900°C for 8 hrs in a muffle oven in order to combust the samples to carbon dioxide. The quartz tubes were then cracked under vacuum in order to release the extracted CO₂, which was then cryogenically purified and transferred to the graphitization line. Here the CO₂ extracted from the samples was reduced to solid graphite at 600°C by using high-purity hydrogen as reducing agent and iron powder as catalyst (Figure 27.3). On average, 1 mg of graphite was deposited for each sample on 2 mg of iron powder. The graphite was then pressed in the aluminum target holders of the accelerator ion source, and these were loaded in the accelerator for the measurement of the radiocarbon age. The carbon isotopic ratios (¹⁴C/¹²C and ¹³C/¹²C) were measured by comparing the ¹²C and ¹³C ion beam currents and the ¹⁴C counts measured for the unknown samples with those obtained from reference materials of known isotopic compositions, supplied by the IAEA (International Atomic Energy Agency) (Calcagnile, Quarta, and D'Elia 2005). In particular, the IAEA C6 (sucrose) and C4 (subfossil wood) were used for normalisation and for an estimation of the overall background, respectively. Machine background was estimated by measuring pure unprocessed fossil graphite directly pressed in the target holders. The measured ¹⁴C/¹²C ratios were corrected for mass

fractionation by using the ¹³C values measured on-line with the AMS system, and corrected for sample processing and machine background.

3.1.1. Results

The radiocarbon ages measured for all the samples are summarized in Table 27.1 as uncalibrated years BP. The quoted uncertainty is conservatively given as the largest number between the Poisson statistics associated with ¹⁴C counting and the standard deviation scattering of the ten repeated measurements carried out on each sample. Conventional radiocarbon ages were then calibrated using the last published calibration curve INTCAL09 (Reimer et al. 2009). Calibrated time ranges, corresponding to 95.4 percent probability levels, are also reported in Table 27.1. The calibrated time ranges are also shown for all the measured samples in Figure 27.4. The radiocarbon dating results are essentially well overlapping and refer, within the measurement uncertainty, to the same chronological horizon. Since the measured ages refer to the same archaeological event and namely the large fire which destroyed the Palace G, and in order to obtain a higher chronological resolution for estimation of the age of this event, a further statistical analysis was carried out by combining the measured radiocarbon ages by using the R_Combine function in Oxcal. The statistical analysis of the data revealed that the measured ages follow a normal distribution except for the results obtained for the sample LTL388A, which were then excluded from the following analysis as an outlier. The combination of the results allowed to obtain a weighted average for the radiocarbon age of the fire of 3870 ± 8 BP corresponding to calibrated ranges of 2458–2418 B.C., 2408–2375 B.C., 2367–2293 B.C. with probabilities of 18.8%, 23.0% and 53.6%, respectively. Figure 27.5 shows in a graphic form the results of the statistical combination of the data.

NOTE

- 1 CEDAD (Centre for Dating and Diagnostics), Department of Engineering for Innovation, University of Salento.

EDITORIAL NOTE

The following samples had been measured in the 1980s and 1990s at the Radiocarbon Laboratory of the Department of Earth Sciences, Sapienza University of Rome by Prof. Gilberto Calderoni (lab numbers followed by uncalibrated ages in yr BP, 1σ) and are listed here for the sake of completeness:

1. Rome-1575: 3970 ± 50 . Royal Palace G, square DIV5i, floor of room L.2752 (bucket TM.75.G.755).
2. Rome-1576: 4070 ± 50 . Royal Palace G, square DIIV1, floor of level 6, TM.80.
3. Rome-1580: 4240 ± 40 . Royal Palace G, room L.2913, TM.80.
4. Rome-1581: 4010 ± 50 . Royal Palace G, room L.2984, TM.79.
5. Rome-609: 4185 ± 70 . Building P4, square DiVI7ii, room L.5038, level 4, TM.94 (charcoal, sample 47).



Figure 27.1. A view of the accelerator room at CEDAD.

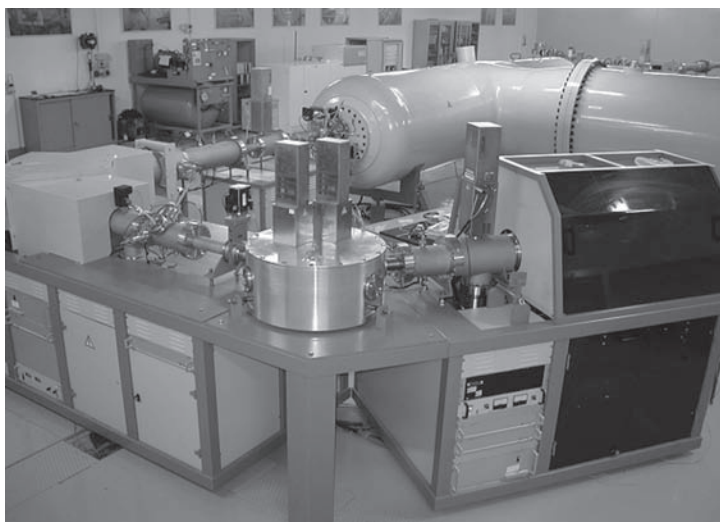


Figure 27.2. The AMS ion source and the low energy mass spectrometer.



Figure 27.3. The high purity graphitization lines of the CEDAD chemical sample processing laboratories.

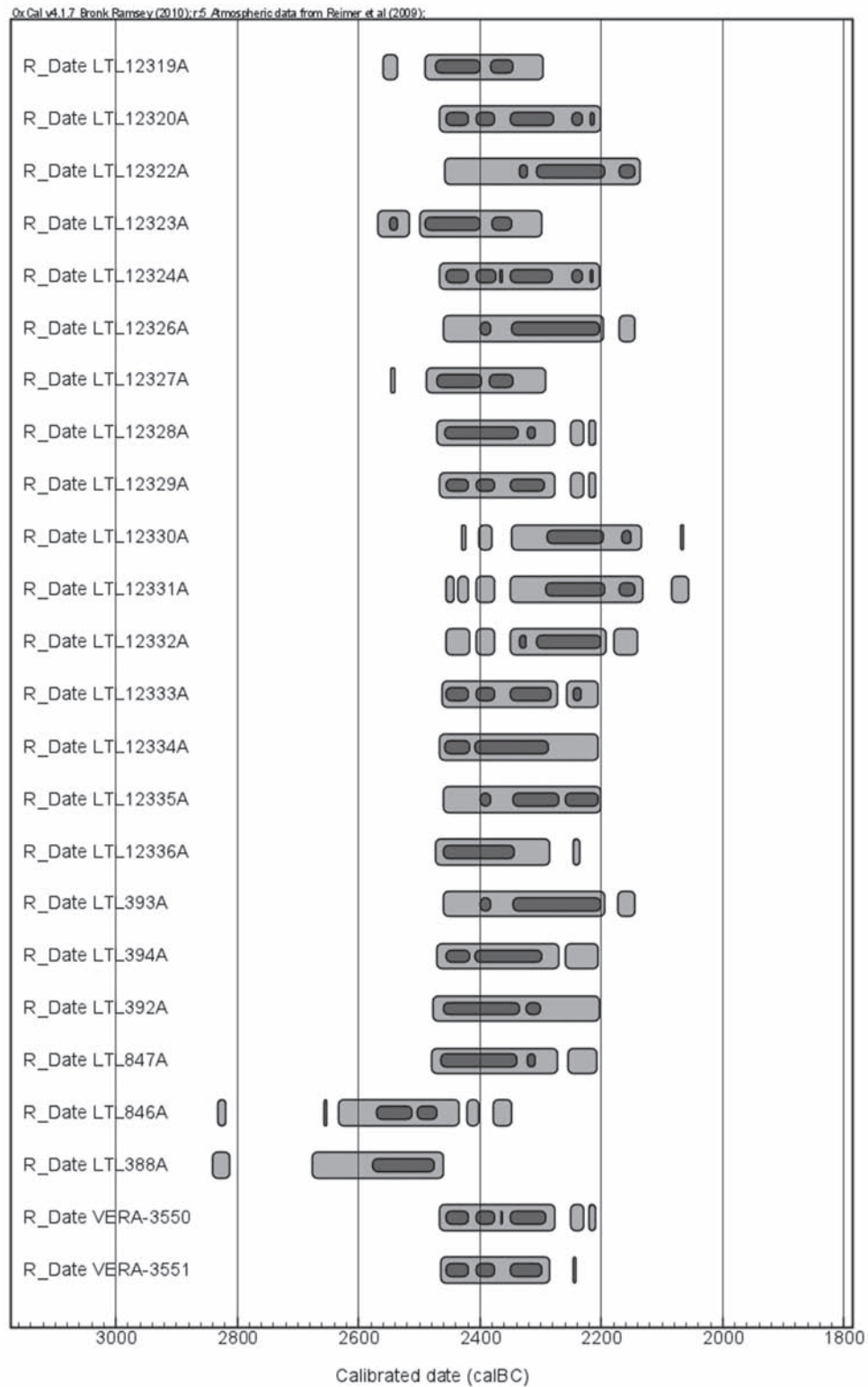


Figure 27.4. Calibrated time ranges. The intervals corresponding to 68.2 % and to 95.4 % confidence levels are indicated in dark and light grey, respectively.

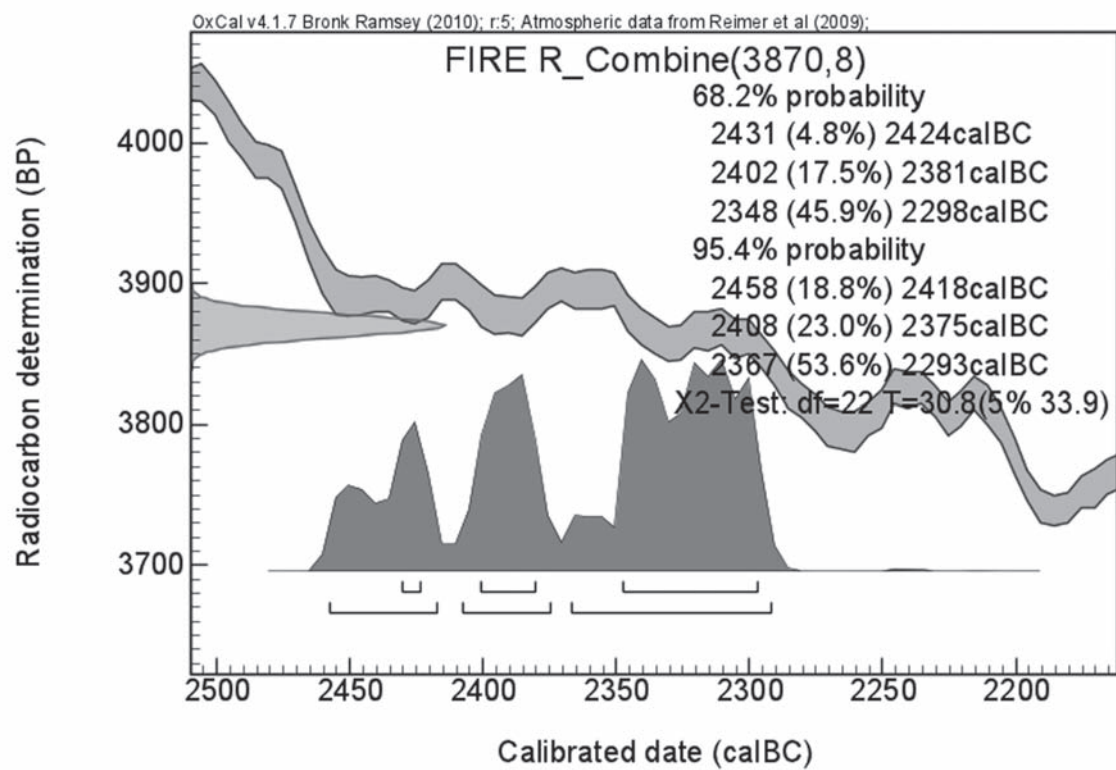


Figure 27.5. Results of the statistical combination of the data obtained for the samples.

CONCLUSIONS

IN SEARCH OF AN EXPLANATORY MODEL FOR THE EARLY SYRIAN STATE OF EBLA

P. Matthiae and N. Marchetti

Explanation, the goal toward which research should strive, stems from models that are superimposed to the evidence. These models are continually adapted to the increasingly richer knowledge produced by analyses of the data, all the more so in the framework of a multidisciplinary perspective benefiting from several different points of view. In fact, archaeological evidence is the product of choice and invention. In other words, it is a construct that is perpetually redefined. The models used to describe and explain complexity can only stress selected aspects of the underlying processes at the expense of a multitude of others, because of the vast numbers of variables involved and the lacunae in our data sets.

The functioning of early states has been addressed in a systemic way in recent years, through some significant studies (Feinman and Marcus 1998; Yoffee 2004), which paved the way for developing in-depth analyses, also on a comparative basis. The interrelations of individual city-states with their hinterland both in Mesoamerica (Blanton et al. 1999; Charlton et al. 2000) and Mesopotamia (Adams 2008) have now been firmly established by highlighting how political power, economic manipulation, market orientation, and tribute collection were structured and balanced one against the other. Extensive regional surveys and refined archaeological archaeologies have the potential to further refine our understanding of ancient production systems and to identify alternative patterns of macroregional interaction

(Kowalewski 2003; 2004; 2008; Balkansky 2006).

The abundance of archaeological and textual evidence, and of outstanding quality, gives Ebla a special place in the studies aiming for an integrated historical reconstruction of a town and its *chora*. The evidence recovered during nearly fifty years of systematic archaeological investigations at Tell Mardikh is of the greatest importance for the reconstruction of the natural and cultural background of a key political center at the time of the so-called Second Urbanization of the ancient Near East. In fact, Ebla has provided one of the widest and most complete corpora of evidence—written, symbolic, and material—among the sites of the time in the Near East. As the archaeological remains of Royal Palace G suggest and the texts of the Royal Archives fully document, around 2300 B.C. Ebla was an actor of primary importance not only in the Syrian region, but on the whole Syro-Mesopotamian stage, and it played a very important role in the historical phase that culminated with Sargon of Akkad imposing his hegemony over the entire area—a period acutely defined many years ago by Henri Frankfort as Proto-Imperial, during which the political protagonists were, certainly in different ways, Ebla, Nagar, Mari, Kish, Uruk, and Akkad. It should also be noted, in passing, that the synchronization of the complex series of events from that period can only be ascertained within a relative chronological perspective (cf. Marchesi and Marchetti 2011, 137–40 and table 16; Matthiae 2010b, 48–63) and not within an

absolute framework derived from radiometric determinations (see below).

The present research, of which we have offered some preliminary results in the archaeological, epigraphic, bioarchaeological, archaeometric, geomorphological, and ecological spheres, aims at reconstructing the landscape of the Eblaite *chora* in its historical and socioeconomic aspects, besides the natural ones. Based on the data collected and their forthcoming elaboration, we ultimately aim at developing a dynamic model tailored on this particular case study, but also useful to describe more broadly how an early state—even one that exerted a wide territorial control and pursued long-distance trade, diplomatic efforts, and an aggressive military policy—in fact rested upon the economic foundations of its hinterland. Indeed, changes in the hinterland preceded and followed the structuring and eventually the collapse of the complex organization that presided over it. The specific ecological and social foundations of the Ebla *chora* help explain the contrast between Ebla and other centers in lower Mesopotamia, since the need to organize a large agricultural hinterland induced the central administration of Ebla to progressively erode social and ownership patterns (traditionally belonging to villages rather than to the central organization) at its own advantage, thus causing significant potential instability (Matthiae 1993b; 2010b, 44–47).

In the Introduction it has been summarized how the topographical and remote sensing basis of our research represents the necessary setting for it. A first environmental analysis of the current situation as regards soil classification (Arnoldus-Huyzendveld) and modern cultivations (Rossi, Ventura, and Vignudelli) has been coupled in this book with studies in zooarchaeology (Minniti, with a diachronic perspective too) and palaeobotany (Wachter-Sarkady on edible plant remains, Caracuta and Fiorentino on the presence of woods). The food-producing hinterland of ancient Ebla thus emerges from this abundant documentation in its multifaceted and articulated organization. The impact of ancient fluctuations of the level of the Matkh lake has also been highlighted (Cantelli, Martina, and Picotti).

The determination of an absolute chronology through ^{14}C analyses is especially useful to create a time frame in which to bracket given cultural phases (identified through the comparison of material assemblages from different sites) and to couple samples taken from archeological contexts with samples from natural deposits, such as those obtained by drilling through the mud layers of the Matkh lake basin (which also contain pollens useful for the palaeoclimatic reconstruction; cf. in general Weiss 2012). We have derived a reliable and significant set of ^{14}C determinations (with a weighted average of 3870 ± 8 BP, corresponding to a calibrated ranges of 2367–2293 B.C. with probability of 53,6% from the EB IVA destruction layer), which is attested throughout the whole site (Calcagnile, Quarta, and D’Elia).

During the high Early Syrian period, Ebla was clearly a large urban hub. Its monuments and Royal Palace G—the royal residence and the main seat for administration, storage, and transformation—are duly described in this volume (cf. Matthiae a, b). Two other contributions focus on the centralization and redistribution of agricultural products within the palace, on the basis of courtly and common glyptic styles (Pinnock) and pottery evidence (Mazzoni). The functional profile of storage jars has also been studied through the analysis of their shapes and possible contents (D’Andrea and Vacca). The pottery assemblage of Building P4, which was separated from the Royal Palace, highlights the relation between specialists (craftsmen manufacturing prestige objects for the elites in the same area in which food was also processed) and the central institution (Marchetti). Clay figurines, which are widely distributed within and outside the city itself, give us information on the larger social and symbolic context (Peyronel). Archaeometric analyses of objects from the Royal Palace G and various places of the Eblaite *chora*—metal objects (Felici and Vendittelli), pottery (Santarelli), and architectural elements (Santarelli and Spreafico)—inform us about the production processes and sophisticated technological skills present in the early state of Ebla (cf. also Peyronel and Vacca).

The quality of the data sets from Ebla allows a detailed consideration of its territory under an archaeological profile. A site from the Early Syrian period to the north-east of Ebla, Tell Tuqan, which has been explored through soundings (Baffi and Peyronel), offers interesting hints as to the nature of rural settlements, as do other excavated sites from the same period in the surroundings of the Eblaite *chora* (Ascalone and D'Andrea). The archaeological landscape of the region around Ebla has been surveyed, and the results of earlier surveys have been reevaluated, having in mind its characterization during the short time period with which our project is concerned. Preliminary results are very promising and highlight seemingly significant diachronic patterns (Mantellini, Micale, and Peyronel), which can eventually be matched with the articulation through time of the thriving and complex economy of high Early Syrian Ebla and the connected reshaping of the anthropic landscape. The surveys carried out in central and northern Syria, even beyond the territory that Ebla presumably controlled, have been discussed and presented according to the regions in which they were set (Mantellini). Although these records vary greatly in quality, their evaluation may lead to singling out coherent patterns connected, for example, with the integration of the steppes in the economic system at the height of the urbanization process, as suggested by the 220 km-long wall reaching from the Anti-Lebanon ranges to the south-eastern sector of the Eblaite *chora*.

The Royal Archives of Ebla contain a wealth of information on the functioning of an early state of the Bronze Age. However, the informative potential of these texts has not been fully exploited so far; scholars have mostly focused on chronology, international relationships, wars, and

so forth, whereas very little attention has been dedicated to the study of the territory of Ebla and to its organization and economy. One of the purposes of the Ebla Chora Project is precisely to obviate this state of things. Two of the articles in this volume (Biga and Ferrero) investigate data that may allow us to identify the boundaries of the territory of Ebla and establish which centers, among the thousands toponyms recorded in the texts, belonged to the Eblaite kingdom. Another paper (Marchesi) deals with the terminology for the field crops, trying to correlate the textual data with the palaeobotanical finds and obtaining some new lexical identifications.

Needless to say, much work is still to be done. As Marchesi points out in his contribution, the study of the role of agriculture and husbandry in the Eblaite economy is still at a preliminary stage. We need a better understanding of the relevant lexicon in order to fully exploit the information provided by the texts (which, incidentally, are mostly unpublished) and to properly evaluate the role played by such economic activities. At the same time, the identification of the toponyms related to centers of the Eblaite kingdom, which has been initiated and is in progress, is propaedeutic to the definition of the extension of the territory of Ebla, the number of its secondary towns and villages, the hierarchy of the various settlements, and the mechanisms of administration and bureaucracy. In this connection, much is to be expected from the study of a small secondary archive, retrieved in L.2764, which mainly contains tablets recording transfers of agricultural products and heads of cattle from various villages to the central administration: these texts may enlighten some fundamental aspects of the Eblaite economy, such as the exploitation of the countryside and the relationships between the capital city and the system of villages and farms.

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ABBREVIATIONS

AAAS = *Annales Archéologiques Arabes Syriennes. Revue d'archéologie et d'histoire.*

AASOR = Annual of the American Schools of Oriental Research.

Adiyat Halab = *Adiyat Halab. An annual book devoted to the study of Arabic science and civilization issued by Aleppo University and Aleppo Archaeological Society.*

AfO = *Archiv für Orientforschung. Internationale Zeitschrift für die Wissenschaft vom vorderen Orient.*

AHw = *Akkadisches Handwörterbuch* (= von Soden 1959-1981).

AJA = *American Journal of Archaeology. The journal of the Archaeological Institute of America.*

Akkadica = *Akkadica. Revue semestrelle du Centre Assyriologique George Dossin.*

AnOr = *Analecta Orientalia.*

AnSt = *Anatolian Studies. Journal of the British Institute of Archaeology at Ankara.*

Antiquity = *Antiquity. A Quarterly Review of World Archaeology.*

AOAT = *Altes Orient und Altes Testament. Veröffentlichungen zur Kultur und Geschichte des Alten Orients.*

AoF = *Altorientalische Forschungen. Schriften zur Geschichte und Kultur des alten Orients.*

AOS = *American Oriental Series.*

ARCANE = *Associated Regional Chronologies for the Ancient Near East and the Eastern Mediterranean.*

Archiv Orientalní = *Archiv Orientalní. Quarterly Journal of African and Asian Studies.*

ARES = *Archivi Reali di Ebla, Studi.*

ARET = *Archivi Reali di Ebla, Testi.*

ARM = *Archives Royales de Mari.*

ASJ = *Acta Sumerologica (Japan).*

AuOr = *Aula Orientalis. Revista de estudios del Próximo Oriente Antiguo.*

BAAL = *Bulletin d'Archéologie et d'Architecture Libanaises.*

BaM = *Baghdader Mitteilungen.*

BAH = *Bibliothèque Archéologique et Historique.*

BAR = *British Archaeological Reports, International Series.*

BASOR = *Bulletin of the American Schools of Oriental Research.*

BCBRL = *Bulletin of the Council of the British Research in the Levant.*

BCSMS = *Bulletin of the (Canadian) Society for Mesopotamian Studies.*

BiMes = *Bibliotheca Mesopotamica.*

BSA = *Bulletin on Sumerian Agriculture.*

CAD = *Chicago Assyrian Dictionary* (= Oppenheim *et al.* 1956-2010).

CDLJ = *Cuneiform Digital Library Journal*

CRAIBL = *Comptes Rendus des séances de l'Académie des Inscriptions et Belles-Lettres*.

CT = Cuneiform Texts from Babylonian Tablets in the British Museum.

CUSAS = Cornell University Studies in Assyriology and Sumerology.

DaM = *Damaszener Mitteilungen*.

DP = *Documents présargoniques* (= Allotte de la Fuyë 1908-1920).

DRS = *Dictionnaire des racines sémitiques* (= Cohen, Bron, and Lonnet 1994ff.).

EVO = *Egitto e Vicino Oriente*. Rivista della Sezione orientalistica dell'Istituto di storia antica, Università di Pisa.

HANEM = History of the Ancient Near East, Monographs.

HANES = History of the Ancient Near East, Studies.

HSAO = Heidelberger Studien zum Alten Orient.

HSS = Harvard Semitic Studies.

JAS = *Journal of Archaeological Science*.

JCS = *Journal of Cuneiform Studies*.

JCSMS = *Journal of the Canadian Society for Mesopotamian Studies*.

JMA = *Journal of Mediterranean Archaeology*.

JNES = *Journal of Near Eastern Studies*.

KTU = *Die keilalphabetischen Texte aus Ugarit* (= Dietrich, Loretz, and Sanmartín 1976).

LAK = *Liste der archaischen Keilschriftzeichen* (= Deimel 1922).

Levant = *Levant. Journal of the British School of Archaeology in Jerusalem*.

MARI = *Mari: Annales de Recherches Interdisciplinaires*.

MDOG = *Mitteilungen der Deutschen Orient-Gesellschaft zu Berlin*.

MEE = Materiali Epigrafici di Ebla.

MSAE = Materiali e Studi Archeologici di Ebla.

MSL = Materialien zum sumerischen Lexikon / Materials for the Sumerian Lexicon.

NABU = *Nouvelles Assyriologiques Brèves et Utilitaires*.

OBO = Orbis Biblicus et Orientalis.

OIP = Oriental Institute Publications.

Or = *Orientalia*.

OrAnt = *Oriens Antiquus*. Rivista del Centro per le Antichità e la Storia dell'Arte del Vicino Oriente.

OrEx = *Orient-Express. Notes et Nouvelles d'Archéologie Orientale*.

PIHANS = Publications de l'Institut Historique-Archéologique Néerlandais de Stamboul (= Uitgaven van het Nederlands Historisch-Archaeologisch Instituut te Istanbul).

QDL = *Quaderni del Dipartimento di Linguistica, Università di Firenze*.

QuSem = Quaderni di Semitistica.

RB = *Revue Biblique*.

RLA = *Reallexikon der Assyriologie* (= Ebeling et al. 1932ff.).

SAOC = Studies in Ancient Oriental Civilizations.

SAQ = Studi Archeologici su Qatna.

ScAnt = *Scienze dell'antichità*.

SEb = *Studi Eblaiti*.

SF = *Schultexte aus Fara* (= Deimel 1923).

SMEA = *Studi Micenei ed Egeo-Anatolici*.

SpTU = *Spätbabylonische Texte aus Uruk*. Berlin / Mainz, 1976ff. (*Teil III* = von Weiher 1988).

SVA = *Schriften zur Vorderasiatischen Archäologie*.

Syria = *Syria. Revue d'art orientale et d'archéologie*.

TLME = *Testi lessicali monolingui "éš-bar-kin_x"* (= Picchioni 1997).

VE = *Vocabulary of Ebla* (MEE 4, pp. 197-343).

VO = *Vicino Oriente. Annuario del Dipartimento di Scienze storiche, archeologiche e antropologiche dell'antichità, sezione Vicino Oriente, Università di Roma*.

WO = *Die Welt des Orients. Wissenschaftliche Beiträge zur Kunde des Morgenlandes*.

WVDOG = *Wissenschaftliche Veröffentlichungen der Deutschen Orient-Gesellschaft*.

ZA = *Zeitschrift für Assyriologie und Vorderasiatische Archäologie*.

ZOA = *Zeitschrift für Orient-Archäologie*.

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 Shamash 36

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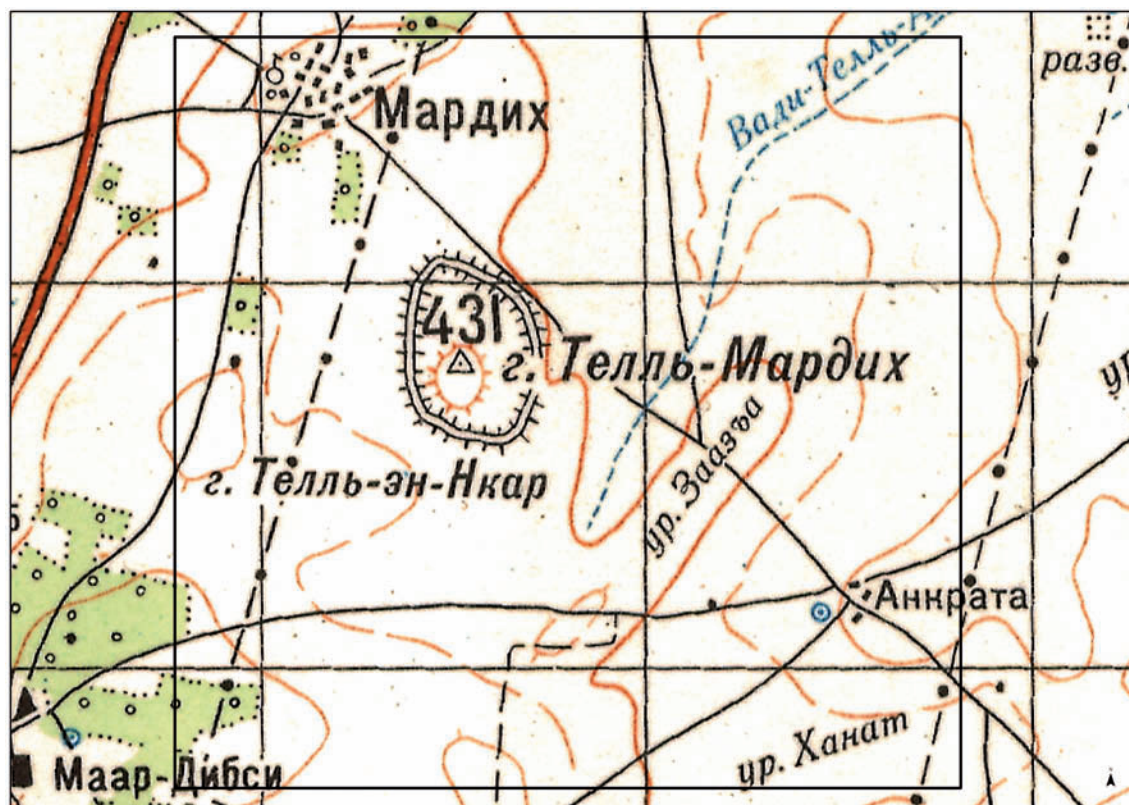
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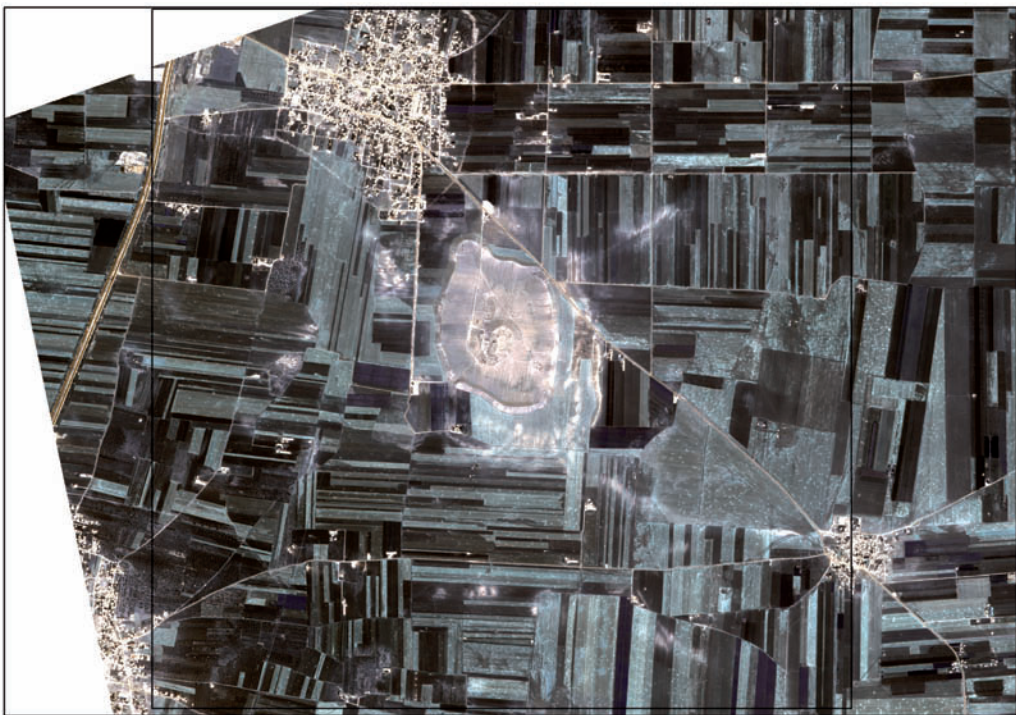
1. Oblique aerial view of Tell Mardikh from the north-west.



2. Detail of Tell Mardikh in a Soviet 1:100,000 topographical map (1984).



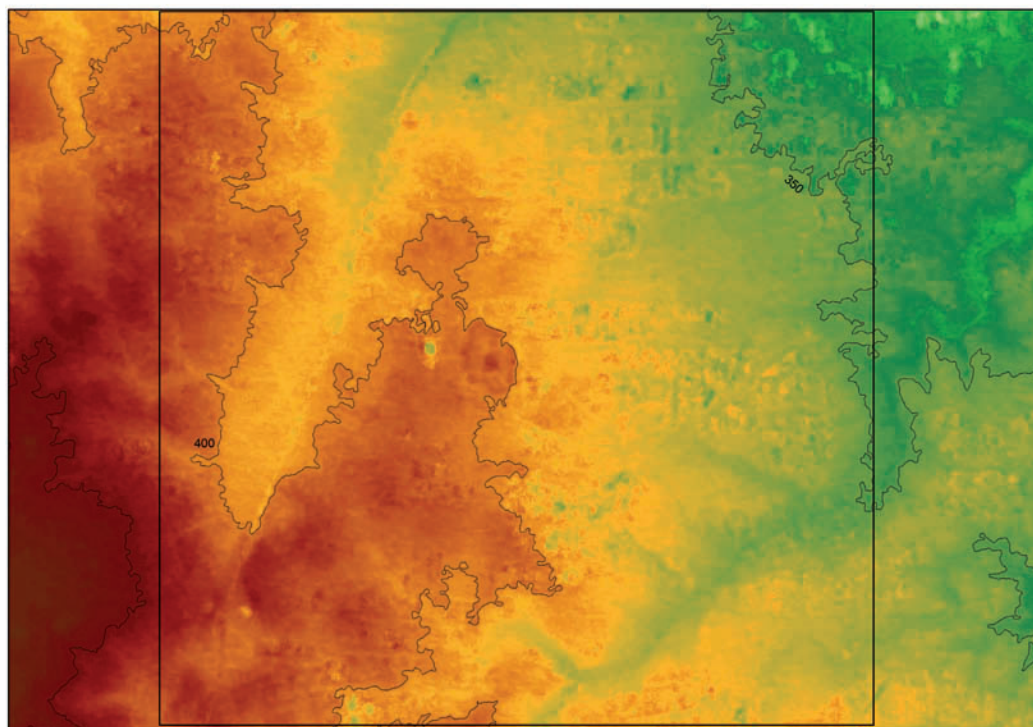
1. Detail of Tell Mardikh in a CNES/Spot satellite image from Google™ Earth Pro (2007); original resolution 2.5 m.



2. Detail of Tell Mardikh in a multispectral WorldView-2 satellite image (2011); resolution 1.84 m.



1. Detail of Tell Mardikh in a GeoEye satellite image from Google™ Earth Pro (2010); original resolution 1.65 m.



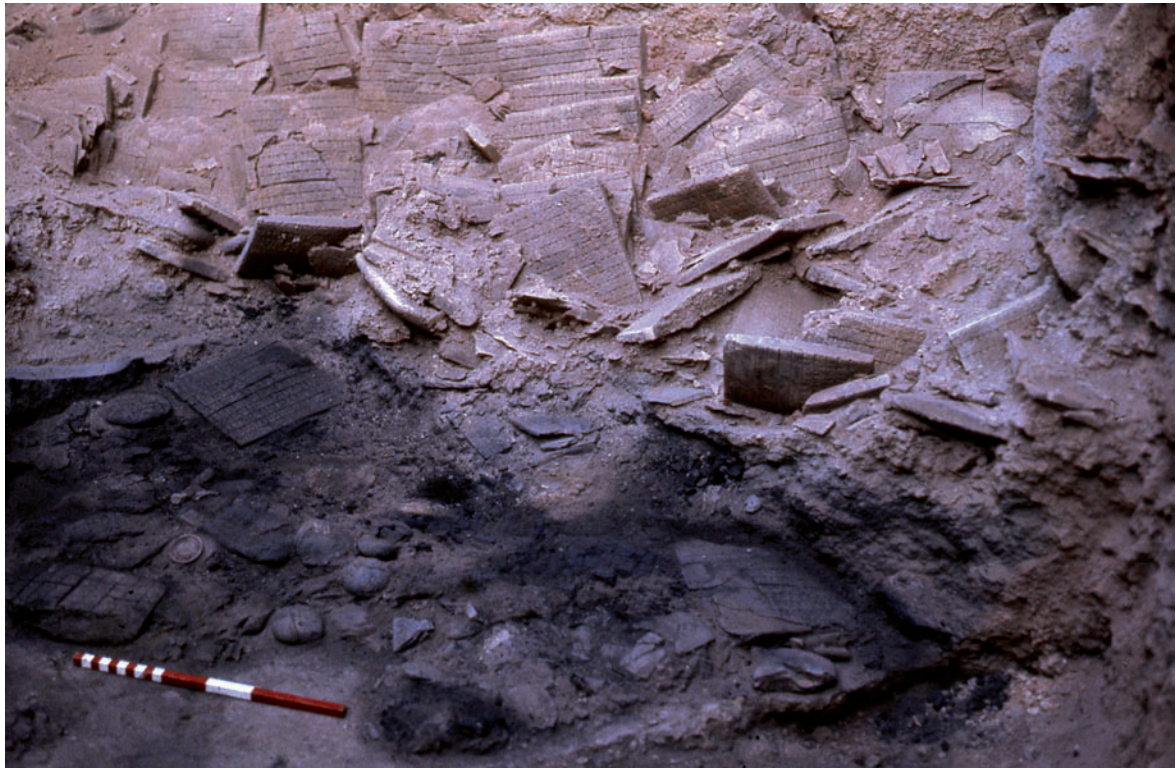
2. Detail of Tell Mardikh in an Aster GDEM v.2 (2011); resolution 30 m; the 400 and 350 m a.s.l. contour lines are highlighted.



1. Ebla, Area HH, the Temple of the Rock in the Lower City south-east, from the east, EB IVA, ca. 2400–2300 B.C.



2. Ebla, Building P4 (L.6272), shell inlays, EB IVA, ca. 2300 B.C.



1. Ebla, Royal Palace G, tablets in situ in the archive L.2769 in the Administrative Quarter, EB IVA, ca. 2300 B.C.



2. Ebla, Royal Palace G, gold leafs, EB IV A, ca. 2300 B.C.



Ebla, Royal Palace G, composite statuette of a queen seated on a throne in wood, gold, jasper, limestone, and steatite (TM.07.G.230), from L.9583, EB IVA, ca. 2300 B.C.



Anthropomorphic figurines: 1. TM.83.G.118; 2. TM.78.Q.202; 3. TM.76.G.76; 4. TM.03.FF.420; 5. TM.83.G.248; 6. TM.83.G.248.



Anthropomorphic figurine: 1. TM.86.G.4; Animal figurines: 2. TM.76.420; 3. TM.96.P403; 4. TM.86.G.21; 5. TM.77.G.33; 6. TM.04.G.187.



1. Ebla, Royal Palace G, L. 3500: pottery in situ in the destruction layer.



2. Ebla, Royal Palace G, L.3512: jar TM.83.G.101/1 in situ.



3. Ebla, Royal Palace G, Table-ware from the storerooms of the South Unit of the Central Complex (EB IVA).



4. Ebla, Royal Palace G, Table-ware from the storerooms of the South Unit of the Central Complex (EB IVA).



1



2

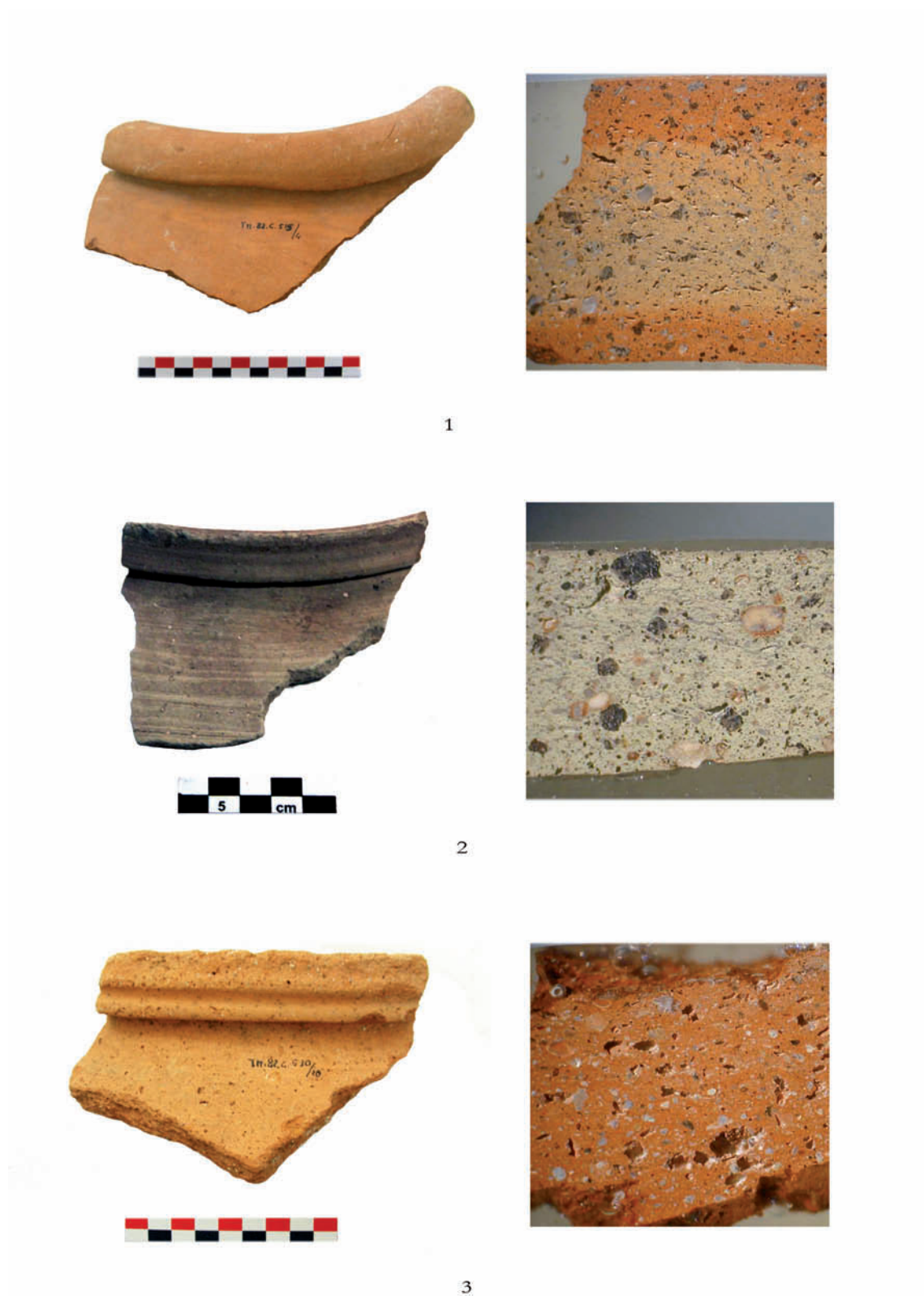


3



4

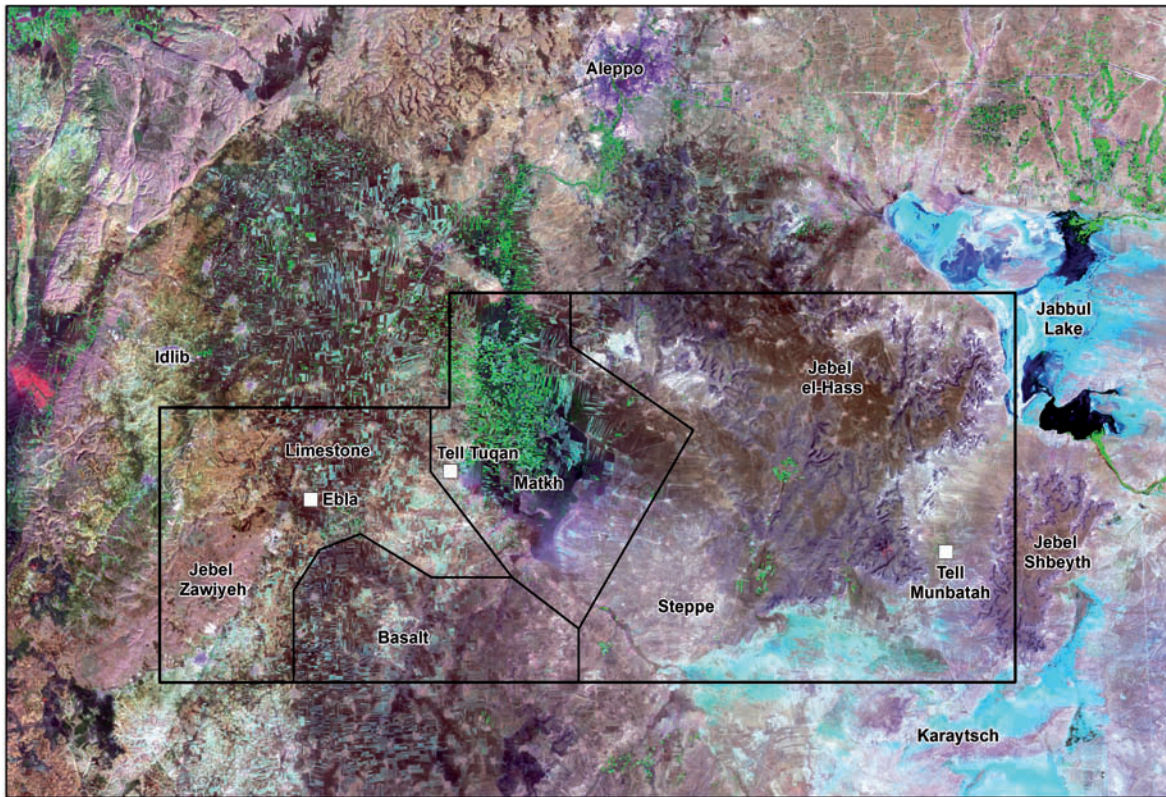
1. TM.83.G.100/1 (L.3512); 2. TM.83.G.129/3; 3. TM.75.G.280/22 (L.2167); 4. TM.75.G.280/12 (L. 2617).



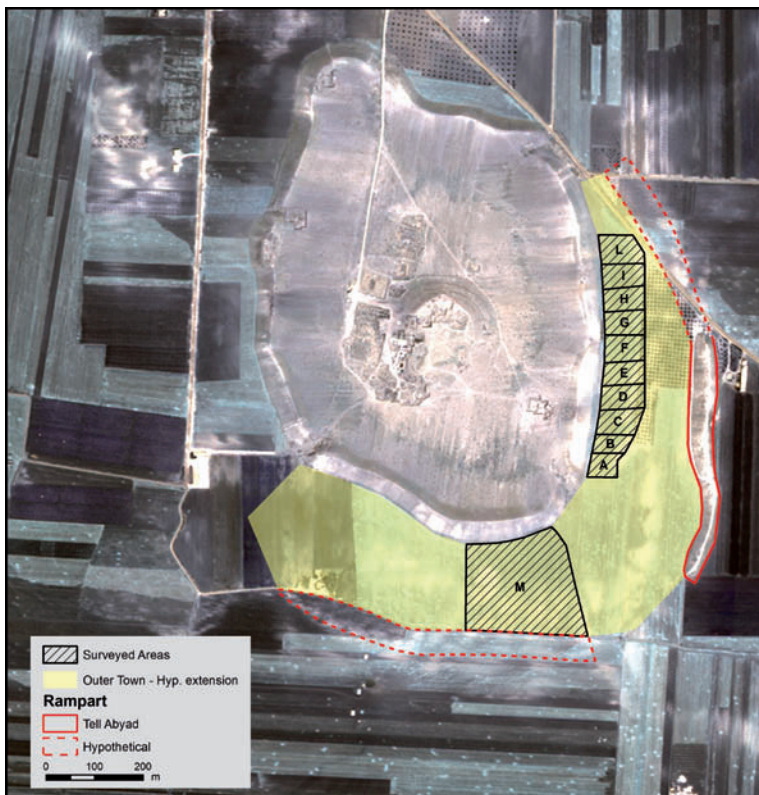
1. TM.G.82.G.515/4 (Petrographic Group A); 2. TM.82.G.530/20 (Petrographic group B); 3. TM.83.G.341/92 (Petrographic Group C).



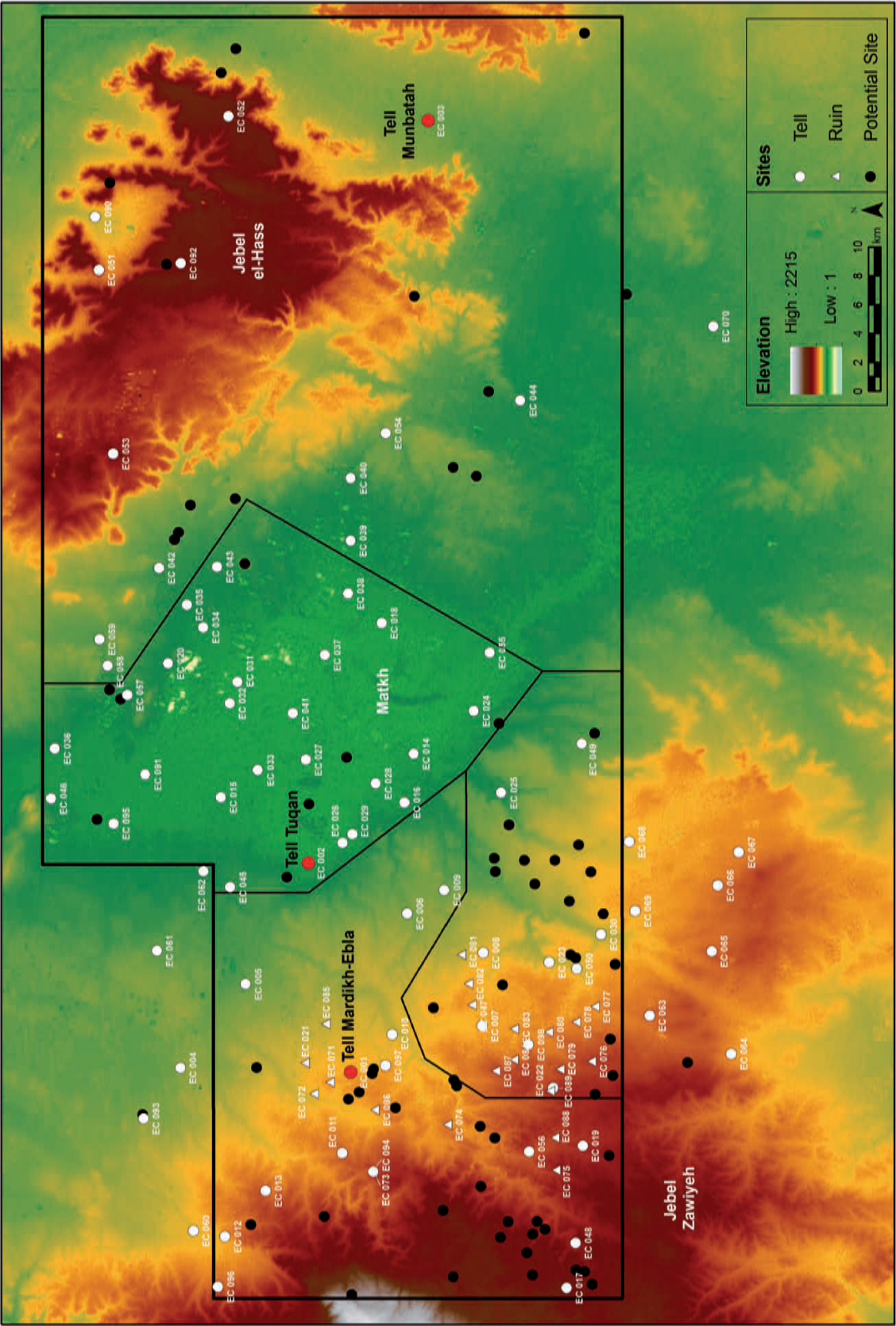
1. Jar rim modeled on the slow wheel by finger impression, TM.83.G.161/1 (L.3519); 2. Jar rim modeled on the slow wheel with a potter's stick, TM.83.G.462/9 (L.3464); 3. Jar with grooved rim modeled on the slow wheel through incision, TM.77.G.225/1.



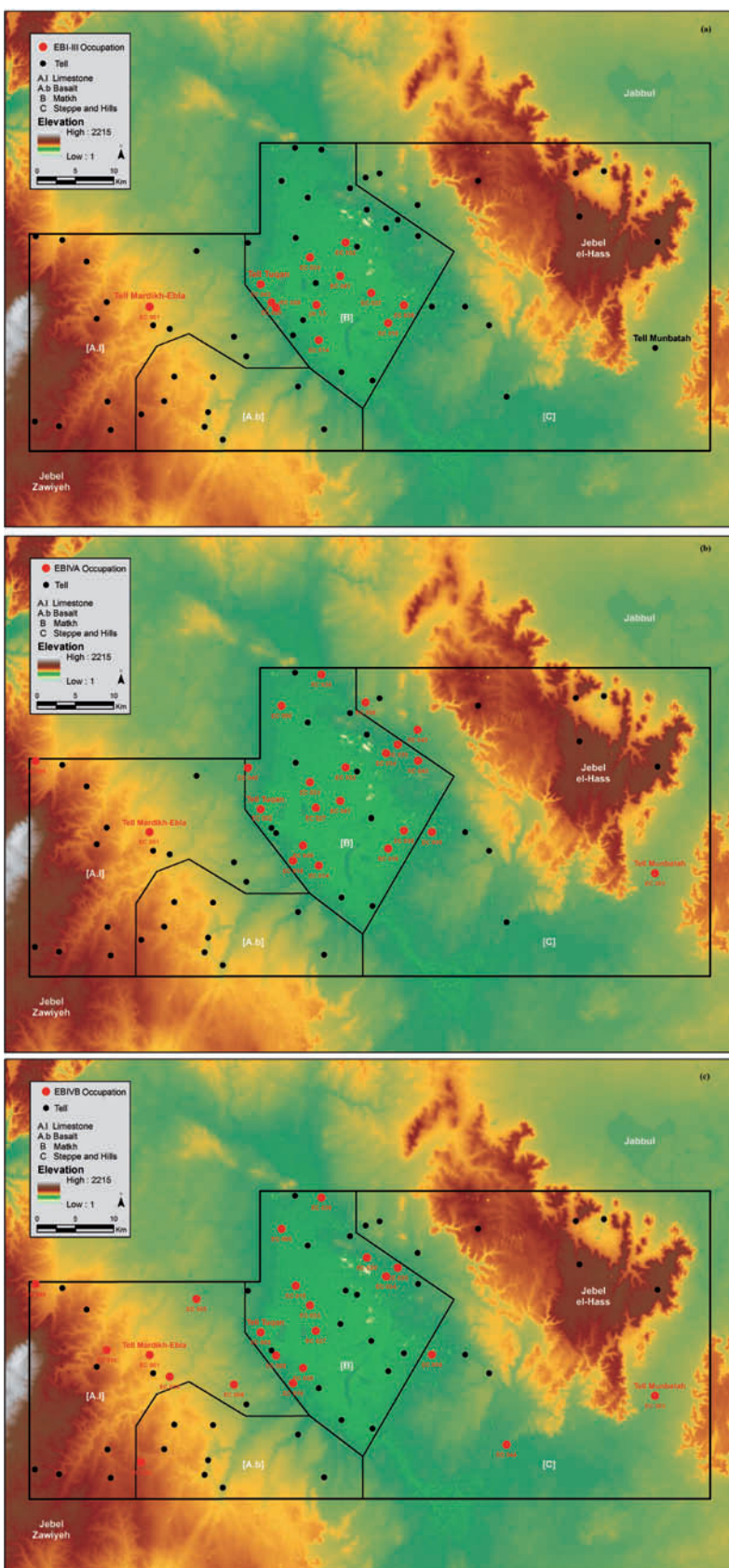
1. The area of the ECP and its partition into three main areas of investigation. In the background a LANDSAT TM satellite image.



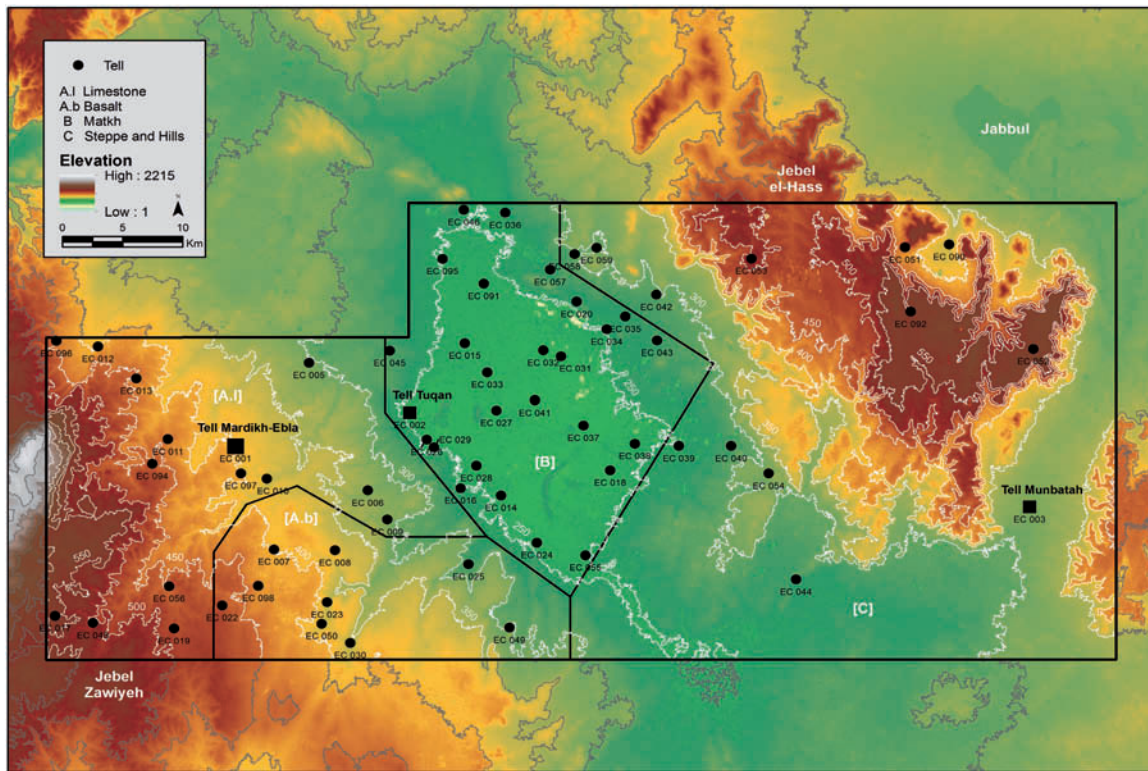
2. WorldView-2 satellite image (August 2011) of Tell Mardikh/Ebla with presumed expansion of the outer town and indication of the surveyed area (off-site survey 2010).



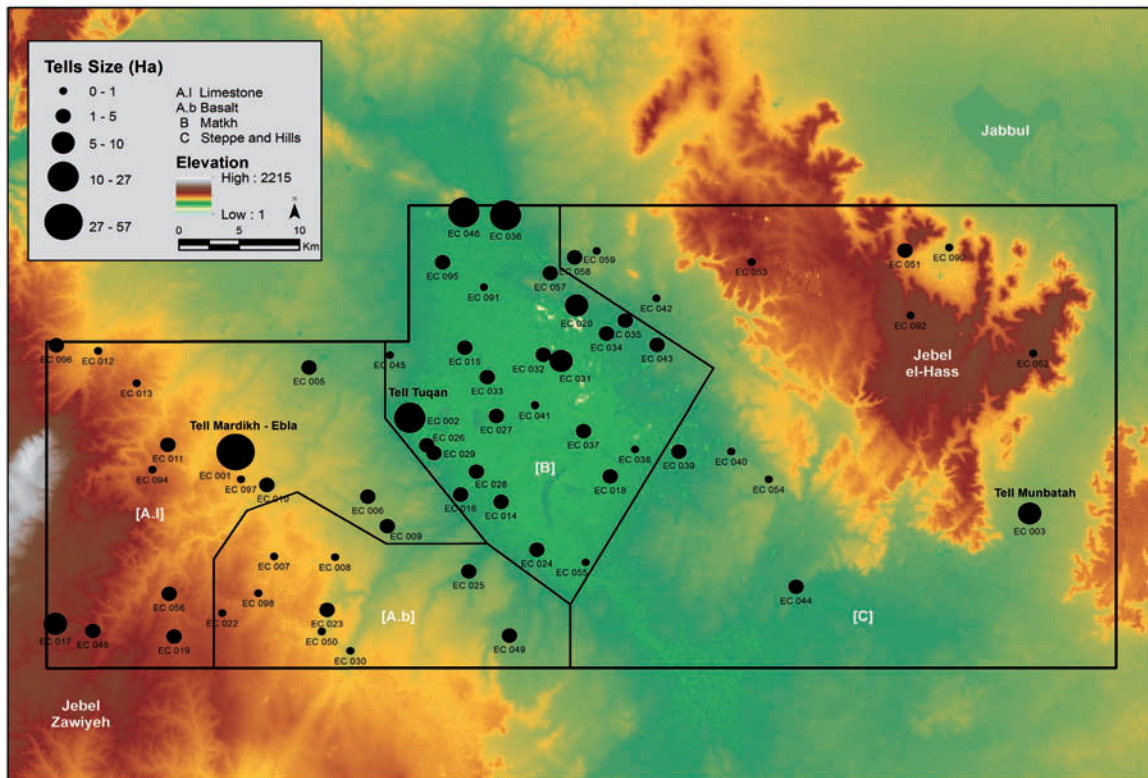
Archaeological map of the Eblaite *chora*. The map also includes some sites surveyed by de Maigret (1978) outside the ECP area of investigation.



Distribution of tells with EBA occupation in the Eblaite *chora*: a. EB I-III tells; b. EB IVA tells; c. EB IVB tells. In the background an Aster GDem v.2 (2011).



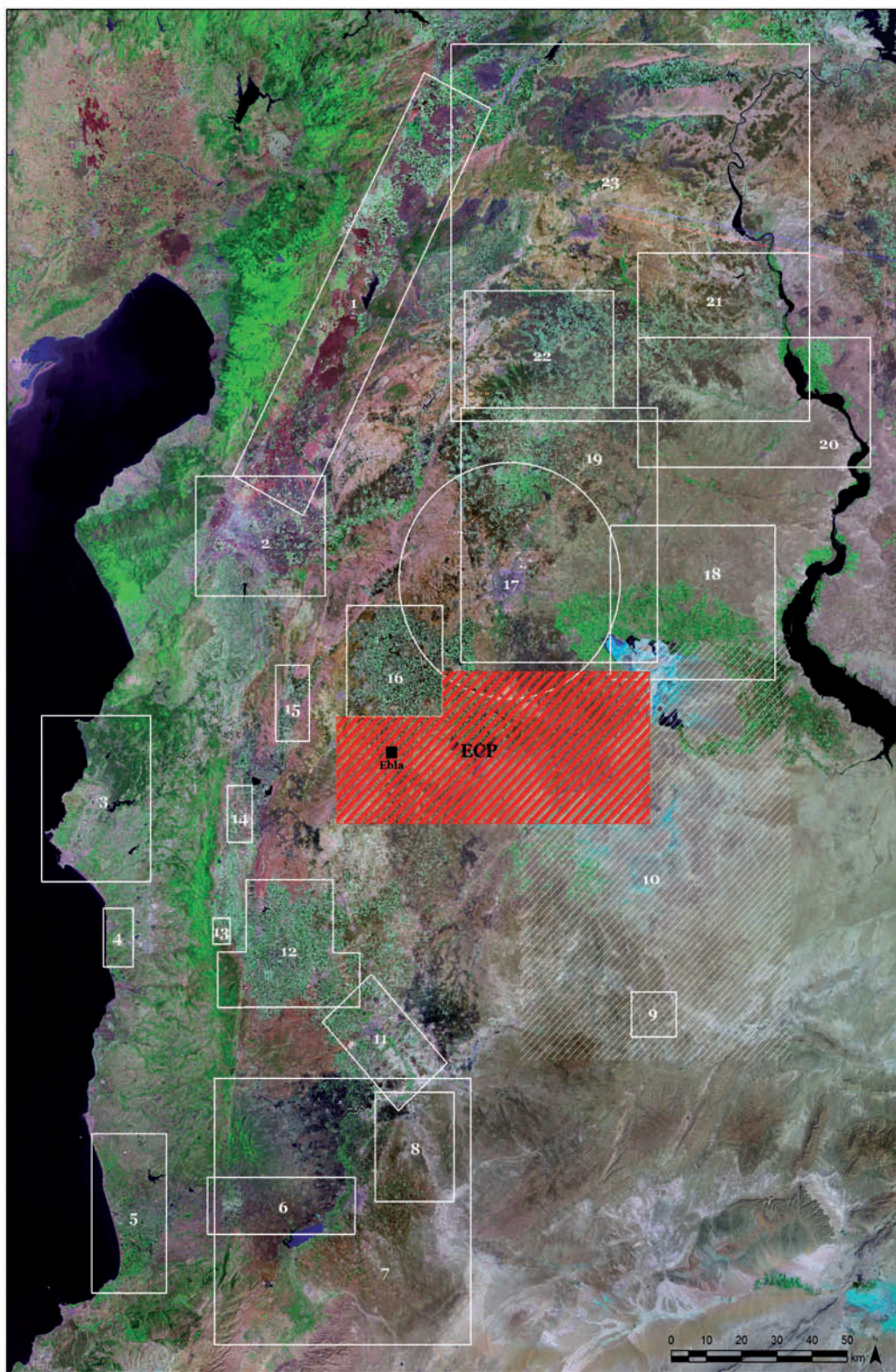
1. Distribution of tells in the Eblaite *chora* according to elevation. In the background an Aster GDEM v.2 (2011) with contour lines at 50 m.



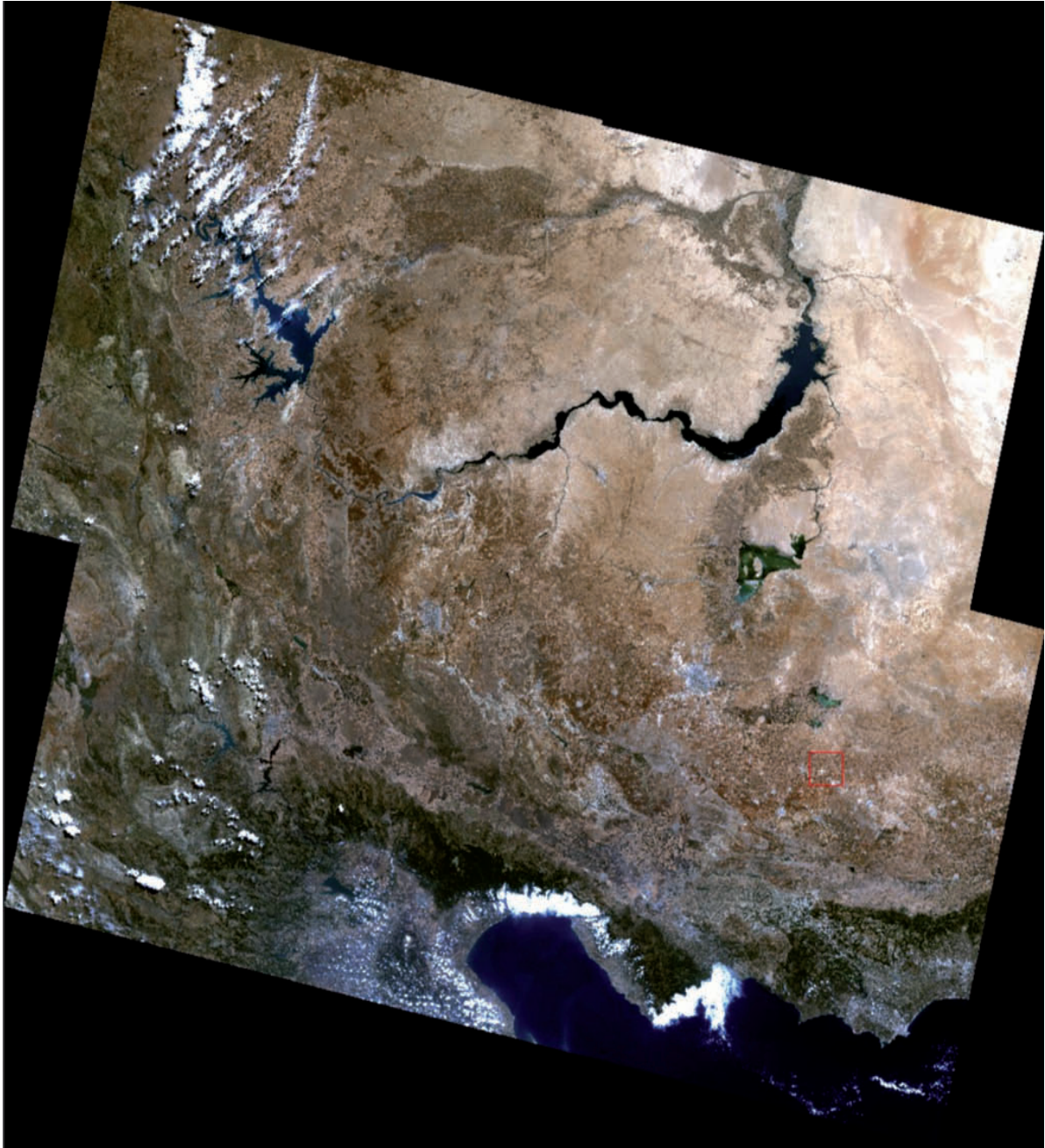
2. Distribution of sites in the Eblaite *chora* according to size. In the background an Aster GDEM v.2 (2011).



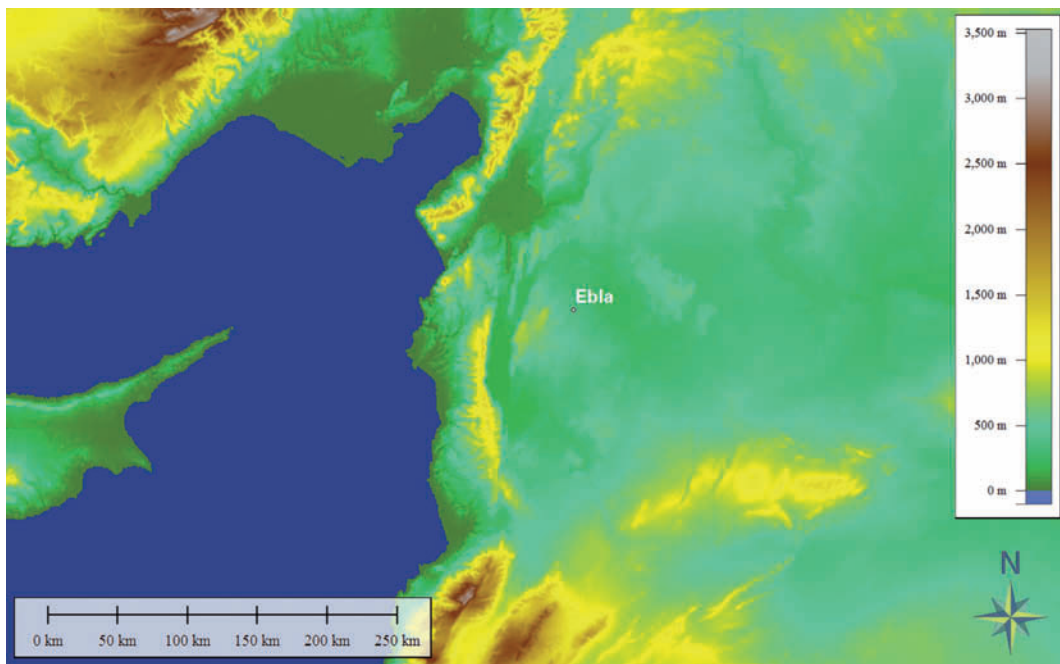
Tell Tuqan, Area P South, kilns of Phase 10, EB III, and detail of wall W.1129 between the two kilns.



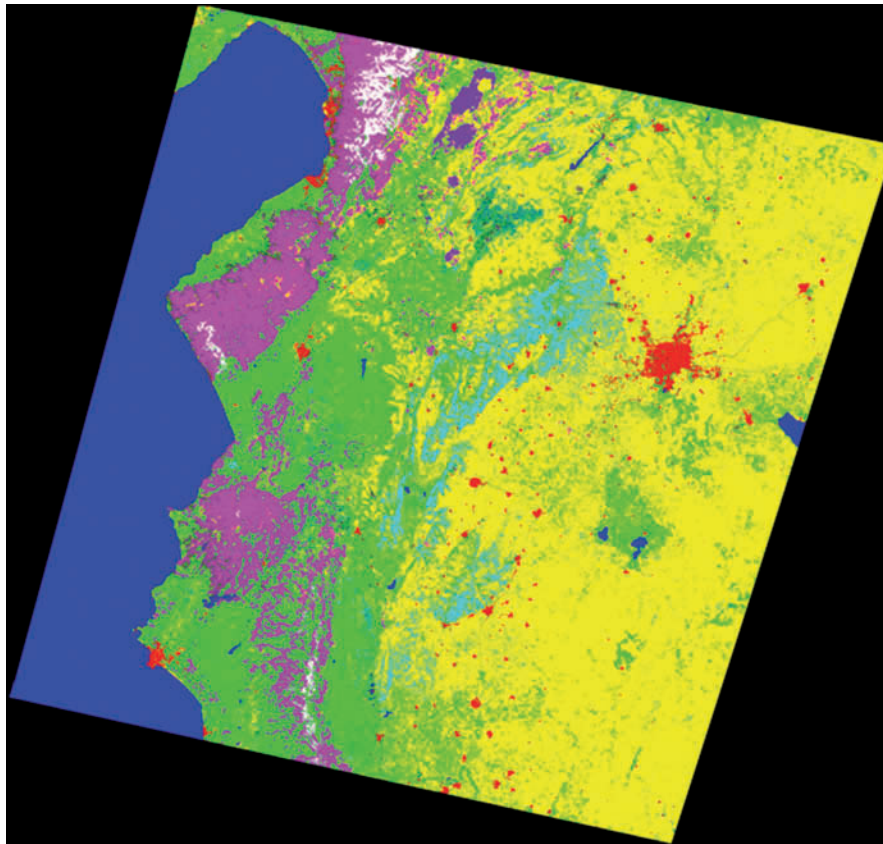
Regional archaeological survey projects in Northern Syria up to 2010 (in the background a LANDSAT TM satellite image).



Mosaic of four Landsat images after radiometric homogenization by empirical line regression algorithm.



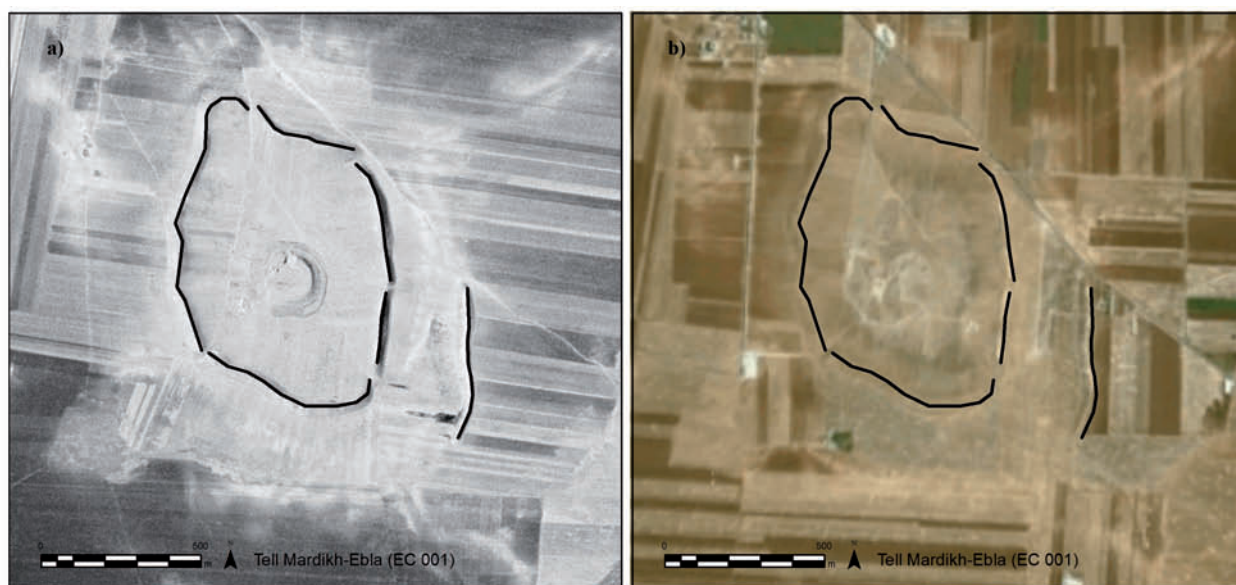
1. Aster GDEM elevation model.



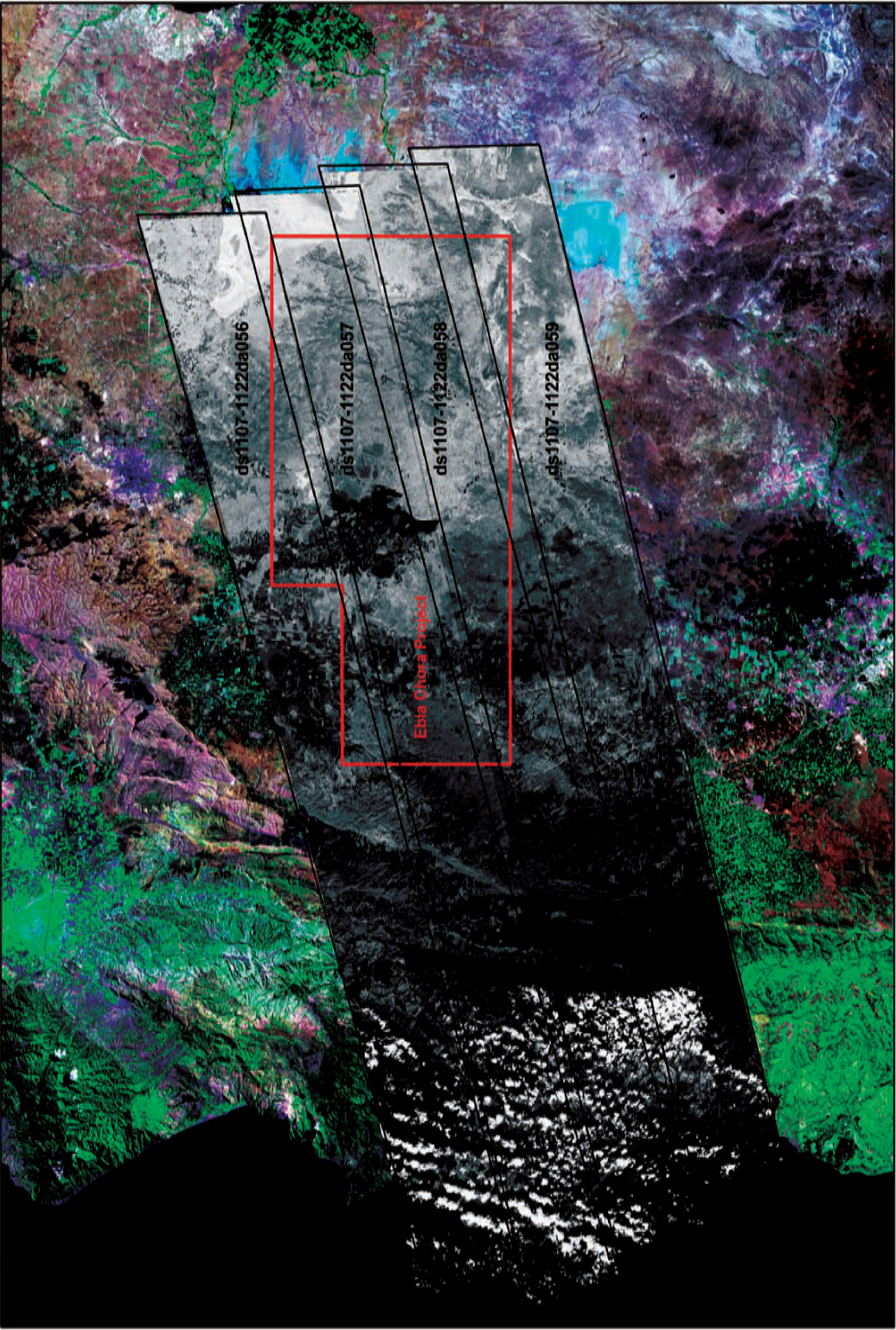
2. Landcover map from multispectral image classification (2007): the main cover types considered are urban (red), cultivated fields (light green), forest (coniferous: magenta; deciduous: light grey), water (blue), bare soil (yellow), and limestone outcrops (cyan).



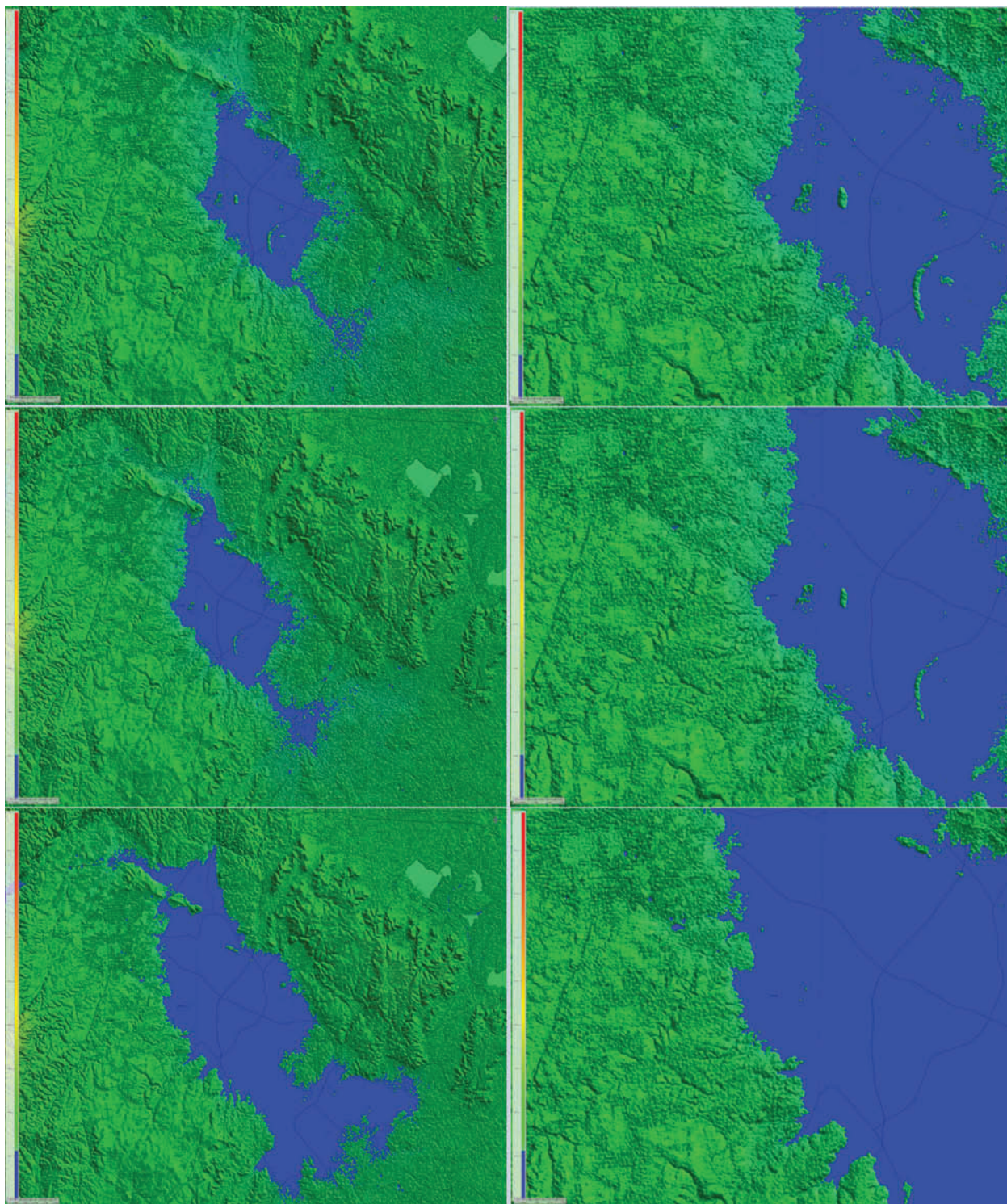
1. Rectification of CORONA using as basemap (a) the Soviet map at 100,000 scale, (b) the GoogleTM Earth Pro mosaic, and (c) the CORONA photograph. The black line refers to the contour of Tell Munbatah (EC 003) drawn on the CORONA basemap.



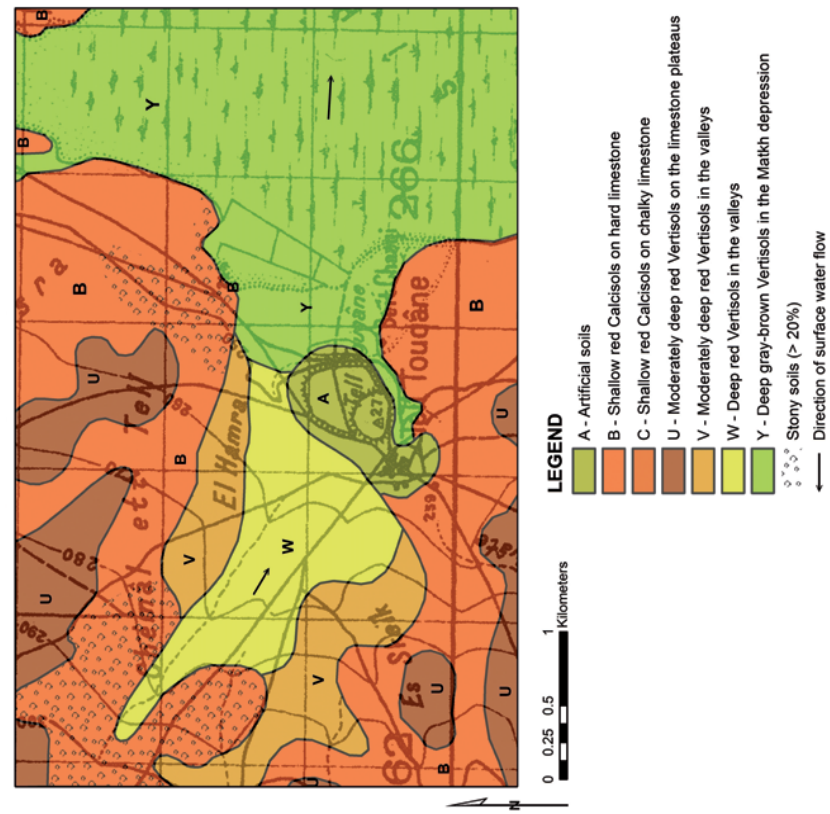
2. Accuracy of the GoogleTM Earth satellite imagery (b) compared to a CORONA photograph (a) (in the frame Tell Mardikh/Ebla, EC 001).



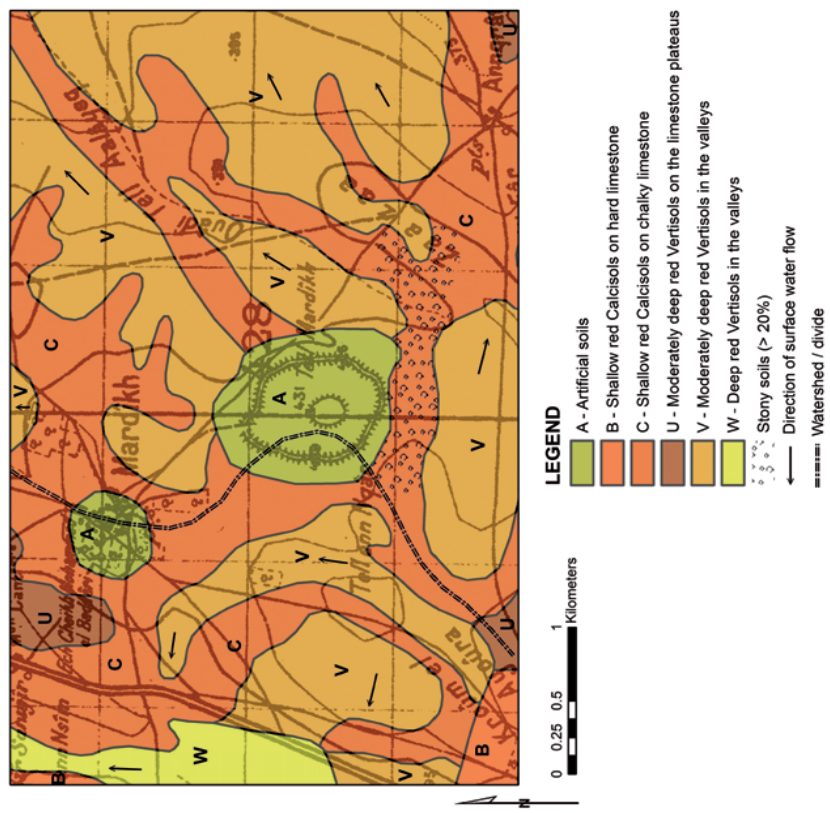
The area of investigation of the ECP and the CORONA photographs used as basemap in the rectification process. In the background a Landsat TM satellite image.



Digital Elevation Model (Aster GDEM) of the Matkh lake, with overimposed three different scenarios. Top: lake level at 250 m a.s.l., which is similar to the wettest recent years. Middle: lake level at 257 m a.s.l., possibly from the beginning of the Middle Bronze Age. Bottom: lake level at 280 m a.s.l. which is the highest level visible from the survey, possibly from late Glacial to early Holocene age (18 to 8 ky B.P.). Left column, panoramic overview. Right column, close-up around Tell Tuqan (red circle).



1. Soil Landscape around Ebla (slightly undulating, slopes 1–3%).



2. Soil Landscape around Tell Tuqan (undulating, slopes 1–8%).



1. Typical landscape of shallow Calcisols (unit C), north-east of Ebla.



2. Nodular calcic horizon in the profile of a moderately deep red Vertisol (unit V), valley west of Tell Tuqan.



1. Cultivation of cereals and legumes in the area to the east of Tell Mardikh.



2. Horticultural crops near Abu Duhur.



3. Intercropping between olive trees and vines, near Maarat en-Numan.



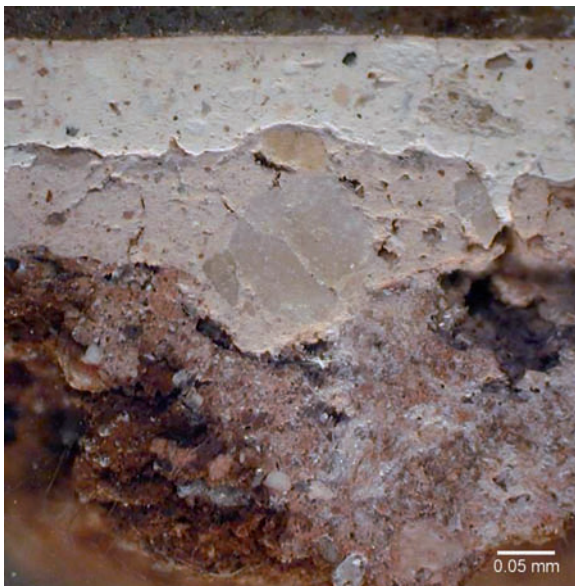
4. Horticultural crops harvested by hand.



1. Thick section (7x) of floor sample TM.83.G.12_ED.



2. Thick section (7x) of floor sample TM.83.G.13_ED.



3. Section of plaster TM.89.G.3_ED.